

00 GENERAL, TECHNICAL DATA

REAR FINAL DRIVE IDENTIFICATION

The 01R rear final drive in the Audi A4 2001 > is assigned to the following transmissions:

- 5-Speed Manual Transmission 01A, AWD
- 6-speed Manual Transmission 01E, AWD
- 6-speed Manual Transmission 02X, AWD
- 6-speed Manual Transmission 0A3, AWD
- Automatic Transmission 01V, AWD
- Automatic Transmission 09L, AWD

Allocation. Refer to **Allocation of mechanical units: 5-speed Manual Transmission 01A AWD**, Technical data

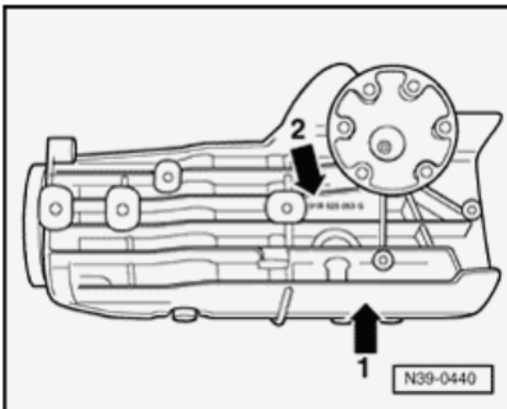


Fig. 1: Locations Of Final Drive Identification

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Location on final drive

Code letters and date of manufacture (arrow 1)

Final drive 01R (arrow 2)

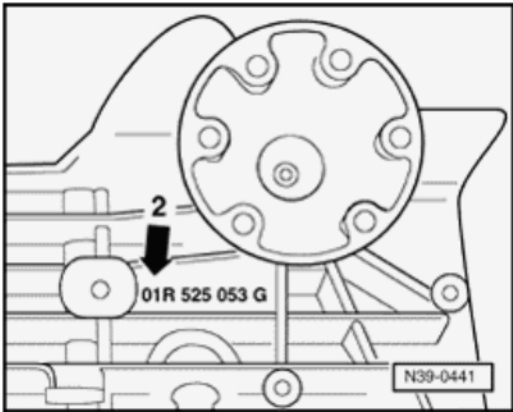


Fig. 2: Final Drive 01R
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Final drive 01R (arrow 2)

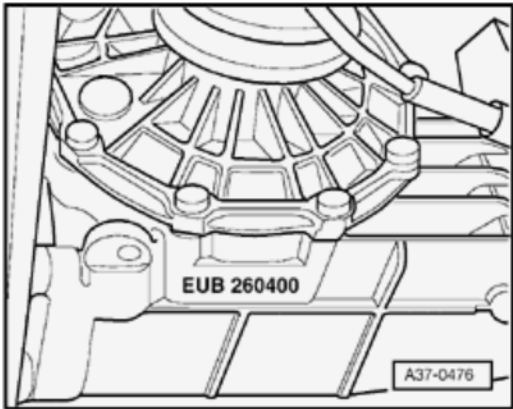


Fig. 3: Locating Code Letters And Date Of Manufacture Of Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Code letters and manufacturing data for the final drive

Example:	EUB	26	04	00
	I	I	I	I
	I	I	I	I
	Code letters	Day	Month	Year (2000) of manufacture

Additional data is production-related

CODE LETTERS, TRANSMISSION RATIOS, CAPACITIES

Allocation of mechanical units: 5-speed Manual Transmission 01A AWD

Rear final drive	01R
1:12:02 AM	Page 2

2005 Audi A4 Quattro**REAR DIFFERENTIAL Rear Final Drive**

Code letters		ETT	ETS
Production	from	02.01	09.00
	to	-	-
Allocation	Model	Audi A4 2002 >	Audi A4 2002 >
	Engine	1.8 l - 110 kW 1.8 l - 120 kW	1.8 l - 125 kW 2.0 l - 132 kW 3.0 l - 162 kW
Ratio	Final drive Z2:Z1 = i	35 : 9 = 3.889	35 : 9 = 3.889
Capacity	1.5 ltr.		
Specification	Gear oil G 052 145 A1 (container size, 0.5 liter) Gear oil G 052 145 S2 (container size, 1.0 liter)		
Axle shaft flange diameter		70.7 mm	75.5 mm

Allocation of mechanical units: 6-speed Manual Transmission 01E, AWD

Rear final drive		01R	
Code letters		ETQ	FUB
Production	from	09.00	11.02
	to	-	-
Allocation	Model	Audi A4 2002 >	Audi A4 2002 >
	Engine	3.0 l - 162 kW	1.8 l - 140 kW 3.0 l - 162 kW
Ratio	Final drive Z2:Z1 = i	37 : 9 = 4.111	35 : 8 = 4.375
Capacity	1.5 ltr.		
Specification	Gear oil G 052 145 A1 (container size, 0.5 liter) Gear oil G 052 145 S2 (container size, 1.0 liter)		
Axle shaft flange diameter		75.5 mm	75.5 mm

Allocation of mechanical units: 6-speed Manual Transmission 02X, AWD

Rear final drive		01R		
Code		ETQ	ETR	ETS
Production	from	09.00	06.03	09.00
	to	-	-	-
Allocation	Model	Audi A4 2002 >	Audi A4 2002 >	Audi A4 2002 >
	Engine	1.8 l - 125 kW	1.8 l - 120 kW	3.0 l - 162 kW
Ratio	Final drive Z2 : Z1 = i	37 : 9 = 4.111	37 : 9 = 4.111	35 : 9 = 3.889
Capacity	1.5 ltr.			
Specification	Gear oil G 052 145 A1 (container size, 0.5 liter) Gear oil G 052 145 S2 (container size, 1.0 liter)			
Axle shaft flange diameter		75.5 mm	70.7 mm	75.5 mm

2005 Audi A4 Quattro

REAR DIFFERENTIAL Rear Final Drive

Allocation of mechanical units: 6-speed Manual Transmission 0A3, AWD

Rear final drive		01R
Code		EXZ
Production	from	11.02
	to	-
Allocation	Model	Audi A4 2002 >
	Engine	4.2 l - 253 kW
Ratio	Final drive Z2 : Z1 = i	35 : 9 = 3.889
Capacity		1.5 ltr.
Specification		Axle oil G 052 145 A1 (container size, 0.5 liter) Axle oil G 052 145 S2 (container size, 1.0 liter)
Axle shaft flange diameter		75.5 mm

Allocation of mechanical units: Automatic Transmission 01V FWD and AWD

Rear final drive		01R	
Code letters		ETQ	ETS
Production	from	09.00	09.00
	to	-	-
Allocation	Model	Audi A4 2002 >	Audi A4 2002 >
	Engine	1.8 l - 125 kW 2.0 l - 132 kW 3.0 l - 162 kW	3.0 l - 162 kW
Ratio	Final drive Z2:Z1 = i	37 : 9 = 4.111	35 : 9 = 3.889
Capacity		1.5 ltr.	
Specification		Gear oil G 052 145 A1 (container size, 0.5 liter) Gear oil G 052 145 S2 (container size, 1.0 liter)	
Axle shaft flange diameter		75.5 mm	75.5 mm

Allocation of mechanical units: Automatic Gearbox 09L, AWD

Rear final drive		01R
Code		GDF
Production	from	07.03
	to	-
Allocation	Model	Audi A4 2002 >
	Engine	4.2 L - 253 kW
Ratio	Final drive Z2 : Z1 = i	31 : 10 = 3.100
Capacity		1.5 ltr.

Specification	Axle oil G 052 145 A1 (container size, 0.5 liter) Axle oil G 052 145 S2 (container size, 1.0 liter)
Axle shaft flange diameter	75.5 mm

TRANSMISSION LAYOUT

Transmission layout

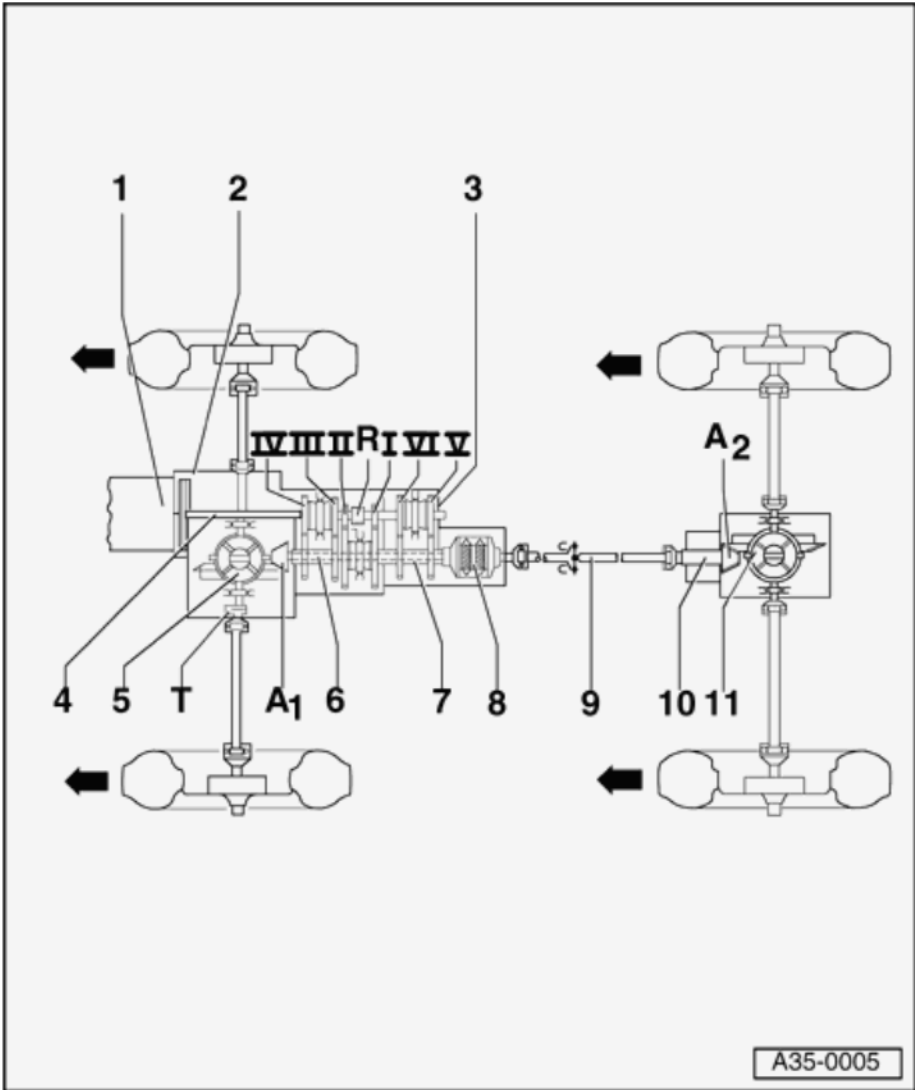


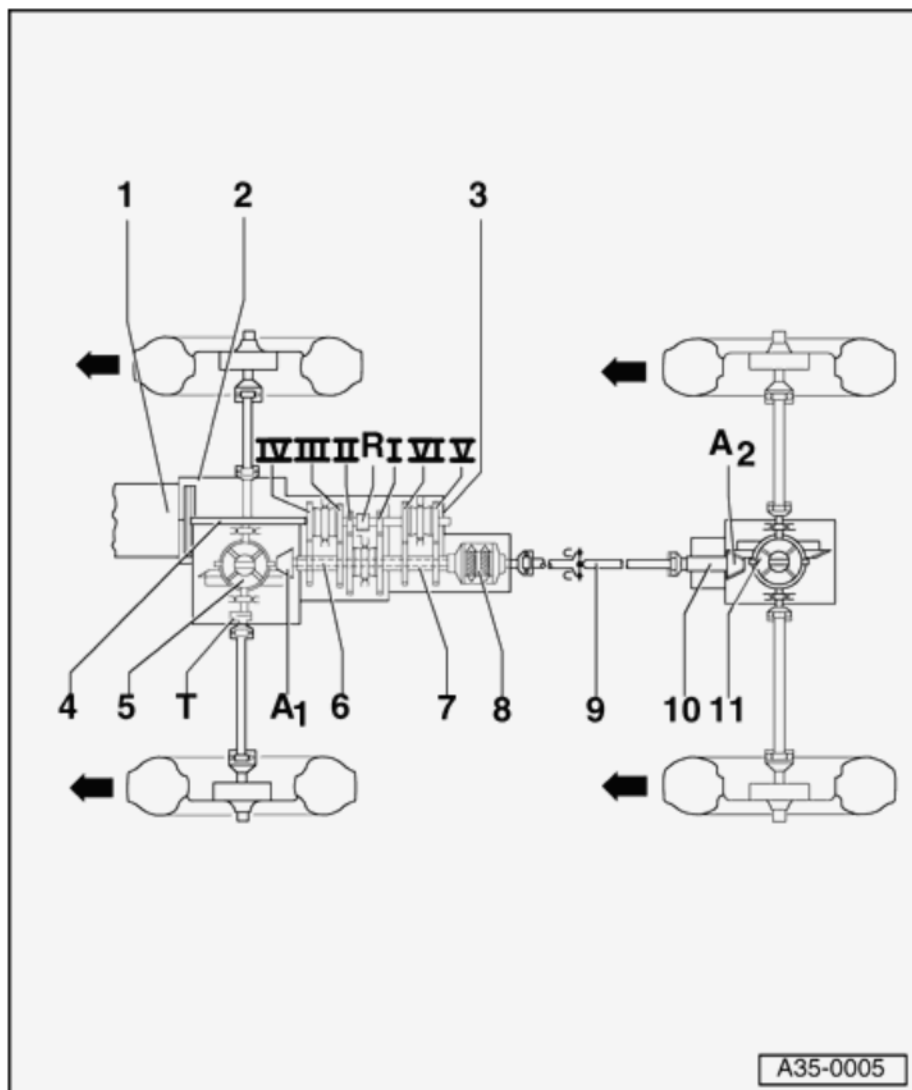
Fig. 4: Transmission, Overview
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Illustrated with the 6-speed manual transmission 01E all wheel drive

Designation

1 - Engine**2 - Clutch****3 - Manual transmission****4 - Input shaft****5 - Front differential****6 - Front drive pinion (output shaft)****7 - Hollow shaft****8 - Torsen differential****9 - Drive shaft****10 - Rear drive pinion****11 - Rear differential**

Arrows in direction of travel

**Fig. 5: Transmission, Overview**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Ratio

I	-	1st gear
II	-	2nd gear
III	-	3rd gear
IV	-	4th gear
V	-	5th gear
VI	-	6th gear
R	-	Reverse gear
A1	-	Front final drive
A2	-	Rear final drive
T	-	Speedometer drive

Arrows in direction of travel

REPAIR INSTRUCTIONS

Repair instructions

The maximum possible care and cleanliness and proper tools are essential to ensure satisfactory and successful transmission repairs. The usual basic safety precautions also naturally apply when carrying out vehicle repairs.

A number of generally applicable instructions for individual repair operations, which are otherwise mentioned at various points in the article, are summarized here. They apply to this article.

Transmission

- When replacing rear final drive the oil level in rear final drive must be checked and, if necessary, corrected. Refer to **Gear oil level in rear final drive, checking**.
- Capacities and specifications. Refer to **Allocation of mechanical units: 5-speed Manual Transmission 01A AWD**.
- When assembling mounting brackets as well as waxed components clean contact surfaces. The contact surfaces must be free of wax and grease.

Gaskets, sealing rings

- Replace O-rings.
- Radial shaft oil seals.

Before installing:



Fig. 6: Identifying Space Between Oil Seal Sealing Lips
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Lightly oil outer circumference and pack space between sealing lips -arrow- half-full with sealing grease G 052 128 A1.

After installation:

Check gear oil in rear final drive; if necessary top off to lower edge of oil filler hole, specification. Refer to **Allocation of mechanical units: 5-speed Manual Transmission 01A AWD.**

Locking elements

- Replace circlips.
- Do not over-stretch circlips.
- Circlips must be properly seated in the base of the groove.

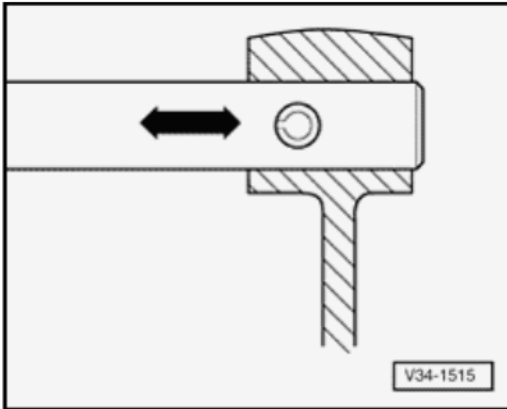


Fig. 7: Identifying Spring Pins Installation Position
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace spring pins.

Installation position: Slot longitudinal to line of force.

Nuts, bolts

- Nuts and bolts which secure covers and housings should be loosened and tightened diagonally.
- Parts which are particularly sensitive must not be tilted; loosen or tighten diagonally in stages.
- Tightening torques stated apply to non-oiled nuts and bolts.
- Replace self-locking bolts and nuts.
- Make sure with all screw connections that contact surfaces as well as bolts and nuts are only waxed after assembly, if necessary.

Bearings

- Attach needle bearing with the written side (greater plate thickness) to the installing tool.
- Install new taper roller bearings in delivery condition and do not oil.
- Always replace taper roller bearings on one shaft together and use new bearings from a single manufacturer.
- Heat inner races to approx. 100°C before installing.

- Do not interchange outer or inner races of bearings of the same size. The bearings are paired.

Adjustment shims

- Check thickness of shims by measuring at several points with a micrometer. Different tolerances make it possible to obtain exact shim thickness required.
- Check for burrs and damage.
- Install only adjustment shims which are in perfect condition.

; Removing and installing exhaust-system components ; Removing and installing exhaust-system components ;
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Removing and installing exhaust-system components ; Removing and installing exhaust-system components

REAR DIFFERENTIAL**Rear Final Drive 0AR****00 - GENERAL, TECHNICAL DATA****IDENTIFICATION OF REAR FINAL DRIVE****Identification of rear final drive**

Rear Final Drive 0AR is allocated to the following transmissions:

- 6-speed Manual Transmission 02X
- 6 speed Manual Transmission 0A3
- Automatic Transmission 09E All Wheel Drive (AWD)
- Automatic Transmission 09L All Wheel Drive (AWD)

Allocation, Audi A4 2002 >, Cabriolet 2003 > --> Code letters, aggregate allocation, ratios, capacities, Audi A4 2002 >, Cabriolet 2003 >

Allocation, Audi A6 2005 > --> Code letters, aggregate allocation, ratios, capacities, Audi A6 2005 >

Allocation, Audi A8 2003 > --> Code letters, aggregate allocation, ratios, capacities, Audi A8 2004 >

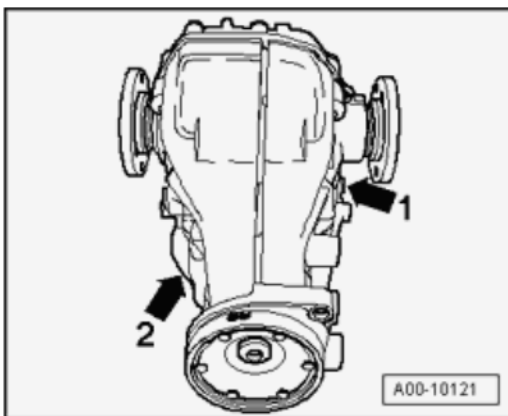
Allocation at rear final drive

Fig. 1: Locating Final Drive 0AR & Identification/Date Of Construction
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Final Drive 0AR - **arrow 1** -

Identification and date of construction - **arrow 2** -

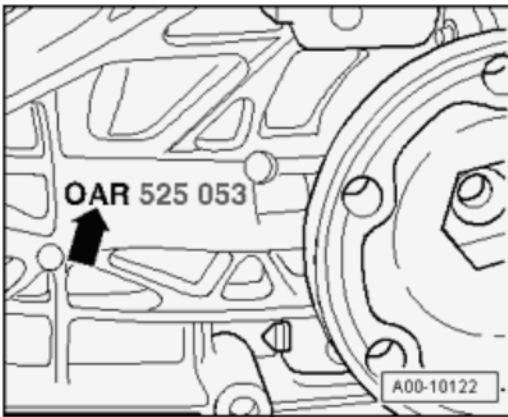


Fig. 2: Identifying Final Drive 0AR & Identification And Date Of Construction
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Final Drive 0AR - arrow -

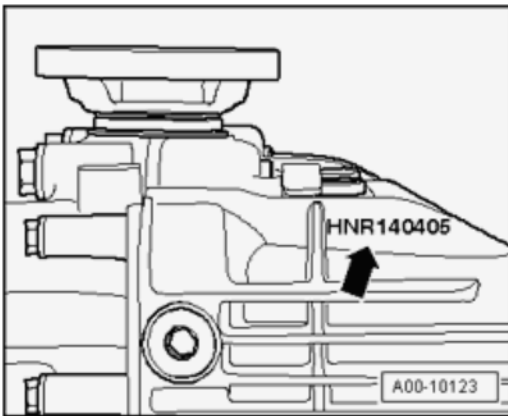


Fig. 3: Identifying Code Letters And Date Of Manufacture Of Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Code letters and date of manufacture of rear final drive

Example:	HNR	14	04	05
	L	L	L	L
	Code letters	Day	Month	Year - 2005 - of manufacturing

Further data can be ignored.

NOTE:

- If rear final drive is replaced, not only the final drive code but also the PR number and the vehicle engine code must always be noted . Only in this way is a correct allocation guaranteed.

Code letters, aggregate allocation, ratios, capacities, Audi A4 2002 >, Cabriolet 2003 >

2005 Audi A4 Quattro

REAR DIFFERENTIAL Rear Final Drive 0AR

Rear final drive			0AR		
Code letters			HNL	HNP	HNR
Manufactured		from to	06.05	11.05	06.05
Allocation	Engine		4.2 L - 253 kW S4 3.2 L - 188 kW FSI 2.0 L - 147 kW TFSI	4.2 L - 253 kW	4.2 L - 309 kW RS4
Ratio		Final drive $Z_2 : Z_1$	31 : 10 = 3.100	35 : 9 = 3.889	37 : 9 = 4.111
Drive axle flange dia.			75.5 mm	75.5 mm	75.5 mm
Capacity			0.9 liter		
Specification			Axle oil G 052 145 A1 (container size 0.5 Liter) Axle oil G 052 145 S2 (container size 1.0 Liter)		
Allocation to engine, manual transmission and automatic transmission via					

Rear final drive			0AR		
Code letters			HNQ	HUN	HUP
Manufactured		from to	06.05	11.05	11.05
Allocation	Engine		1.8 L -120 kW	3.2 L -188 kW FSI	3.2 L -188 kW FSI
Ratio		Final drive $Z_2 : Z_1$	37 : 9 = 4.111	35 : 8 = 4.375	31 : 10 = 3.100
Drive axle flange dia.			70.7 mm	75.5 mm	75.5 mm
Capacity			0.9 liter		
Specification			Axle oil G 052 145 A1 (container size 0.5 Liter) Axle oil G 052 145 S2 (container size 1.0 Liter)		
Allocation to engine, manual transmission and automatic transmission via					

Rear final drive			0AR		
Code letters			HUQ		
Manufactured		from to	11.05		
Allocation	Engine		3.0 L -160 kW 2.0 L -147 kW TFSI		
Ratio		Final drive $Z_2 : Z_1$	35 : 9 = 3,889		
Drive axle flange dia.			75.5 mm		
Capacity			0.9 liter		
Specification			Axle oil G 052 145 A1 (container size 0.5 Liter) Axle oil G 052 145 S2 (container size 1.0 Liter)		
Allocation to engine, manual transmission and automatic transmission via					

2005 Audi A4 Quattro

REAR DIFFERENTIAL Rear Final Drive 0AR

Code letters, aggregate allocation, ratios, capacities, Audi A6 2005 >

Rear final drive			0AR		
Code letters			HNL	HNN	HUN
Manufactured		from to	09.05	11.05	11.05
Allocation	Engine		3.2 L -188 kW FSI	4.2 L - 246 kW 4.2 L - 254 kW	3.2 L - 188 kW FSI
Ratio		Final drive $Z_2 :$ Z_1	31 : 10 = 3.100	32 : 9 = 3.555	35 : 8 = 4.375
Drive axle flange			75.5 mm	75.5 mm	75.5 mm
Capacity			0.9 liter		
Specification			Axle oil G 052 145 A1 (container size 0.5 Liter) Axle oil G 052 145 S2 (container size 1.0 Liter)		
Allocation to engine, manual transmission and automatic transmission via					

Code letters, aggregate allocation, ratios, capacities, Audi A8 2004 >

Rear final drive			0AR		
Code letters			HNK	HNH	
Manufactured		from to	06.05	06.05	
Allocation	Engine		4.2 L - 213 kW 4.2 L - 246 kW	6.0 L - 331 kW	
Ratio		Final drive $Z_2 : Z_1$	31 : 10 = 3.100	32 : 9 = 3.555	
Drive axle flange dia.			108 mm	108 mm	
Capacity			0.9 liter		
Specification			Axle oil G 052 145 A1 (container size 0.5 Liter) Axle oil G 052 145 S2 (container size 1.0 Liter)		
Allocation to engine, manual transmission and automatic transmission via					

POWER TRANSFER, OVERVIEW

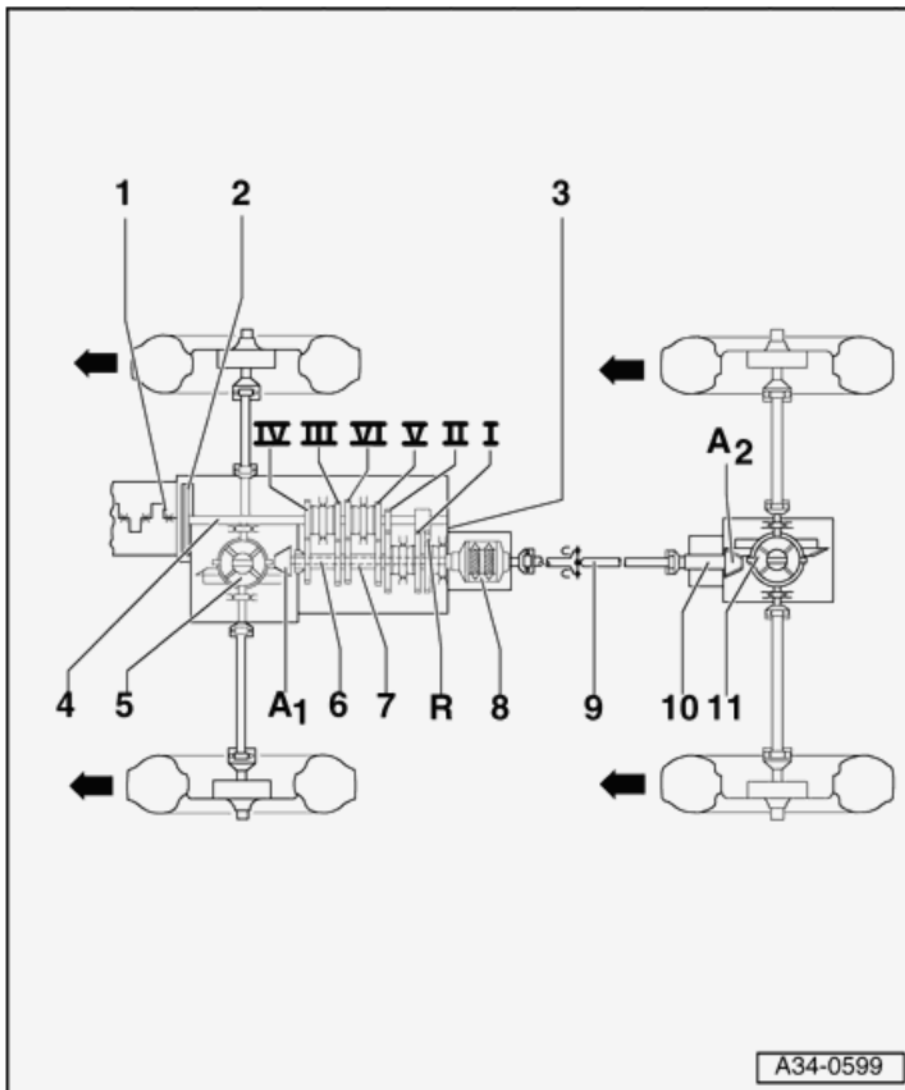
Power transfer, overview

- Depicted with 6 speed manual transmission 0A3 All Wheel Drive.

Nomenclature

NOTE:

- Arrows in direction of travel

**Fig. 4: Power Transfer, Overview**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1 - Engine
- 2 - Clutch
- 3 - Manual transmission
- 4 - Input shaft (main shaft)
- 5 - Front differential
- 6 - Front pinion shaft (output shaft)
- 7 - Hollow shaft

8 - Torsen differential

9 - Driveshaft

10 - Rear drive pinion

11 - Rear differential

Ratio

NOTE:

- Arrows in direction of travel

I - 1st Gear

II - 2nd Gear

III - 3rd Gear

IV - 4th Gear

V - 5th Gear

VI - 6th Gear

R - Reverse Gear

A1 - Final drive-front

A2 - Rear final drive

GENERAL REPAIR NOTES

General Repair Notes

The maximum possible care, cleanliness and proper tools are essential to ensure satisfactory and successful transmission repairs. The usual basic safety precautions also apply when carrying out vehicle repairs.

A number of generally applicable instructions for individual repair procedures, which are otherwise mentioned at various points in the article are summarized under the term "components" --> **Components**. They apply to this article.

Vehicle jack mode on vehicles with air spring suspension

Before raising a vehicle with air spring suspension on a 2-pillar lifting platform (wheels off the ground), first activate the vehicle jack mode --> **43 - SELF-LEVELING SUSPENSION** .

Components

Rear Final Drive

- Allocate bolts and other components according to the Final Drive code via .
- When replacing rear final drive, check and if necessary, correct oil level in final drive --> **Axle oil in rear final drive, checking.**
- Capacities and specification - Audi A4 2002 >, Cabriolet 2003 > --> **Code letters, aggregate allocation, ratios, capacities, Audi A4 2002 >, Cabriolet 2003 >** , Audi A6 2005 > --> **Code letters, aggregate allocation, ratios, capacities, Audi A6 2005 >** , Audi A8 2004 > --> **Code letters, aggregate allocation, ratios, capacities, Audi A8 2004 >**
- Clean contact surfaces when repairing mounting brackets and waxed components. Contact surfaces must be completely free of oil and grease.
- Thoroughly clean all connections and surrounding area before disconnecting.

O-rings, gaskets, seals

- Always replace O-rings, gaskets and seals.
- After removing gaskets and seals, always inspect the contact surfaces at housing or shaft for burrs resulting from removal, or for other signs of damage.
- Thoroughly clean housing joint surfaces before assembling.



Fig. 5: Identifying Space Between Oil Seal Sealing Lips
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Before installing, lightly oil outer circumference of radial-shaft seals and fill gap between sealing lips - **arrow** - half way with *sealing grease G 052 128 A1* .
- The open side of the gaskets points toward the fluid to be sealed in.
- Lightly lubricate O-rings before installing, this prevents the rings from being pinched when inserting.
- Check transmission oil level after replacing gaskets and seals --> **Axle oil in rear final drive, checking.**

Securing rings

- Do not over-stretch circlips.
- Always replace damaged or over-stretched circlips.
- Securing rings must be fully seated in groove.

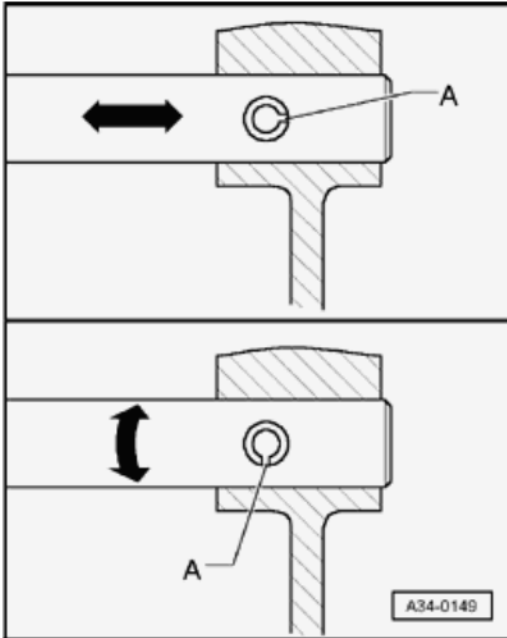


Fig. 6: Identifying Locking Elements

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace roll pins. Installation position: Slot - A - is longitudinal to line of force - **arrow** -.

Nuts, bolts

- Loosen and tighten bolts or nuts for securing covers and housings in diagonal sequence.
- Do not cant, rather loosen and tighten especially sensitive parts in diagonal manner in stages.
- The tightening torques stated apply to non-oiled nuts and bolts.
- Always replace self-locking nuts and bolts.
- Using a wire brush, clean threads of bolts (replace outer driveshaft bolts) which are secured with locking compound. Then insert bolts with *locking fluid AMV 185 101 A1*.
- Threaded bores into which self-locking bolts or bolts with locking compound were threaded in, must be cleaned (e.g. using threaded tap). Otherwise there is the danger that the bolts may shear when removed again.

39 - FINAL DRIVE, DIFFERENTIAL

DRIVESHAFT, SERVICING OVERVIEW

Driveshaft, servicing overview

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NOTE:

- Observe general repair notes --> General Repair Notes.
- No repair work can be performed on the driveshaft - with the exception of removing and installing and adjustment work.
- Always store and transport driveshaft fully extended only.
- - If the driveshaft is only detached at the transmission or from rear final drive, it should be tied up or supported at the shaft end. Driveshaft must also bend without force up to the center joint stop.
 - Mark positions of all parts to each other before removing. Reinstall in identical position otherwise imbalance will be too high which could result in damage to the bearing or in vibration noises.
 - Driveshaft bolts are loosened and tightened with the parking brake engaged.
 - After disconnecting driveshaft from rear final drive, an installed balance washer (thick washer between backing plate and hex socket head bolt) may not be reinstalled.

Driveshaft can be bent without force up to the center joint stop. A hard bending to the stop may cause damage to the center joint or dust boot.

- For complaints (noise, vibrations), check intermediate bearing for freedom from tension and radial run-out of driveshaft flange at rear final drive before replacing the driveshaft --> Measure radial play at flange/driveshaft and mark.

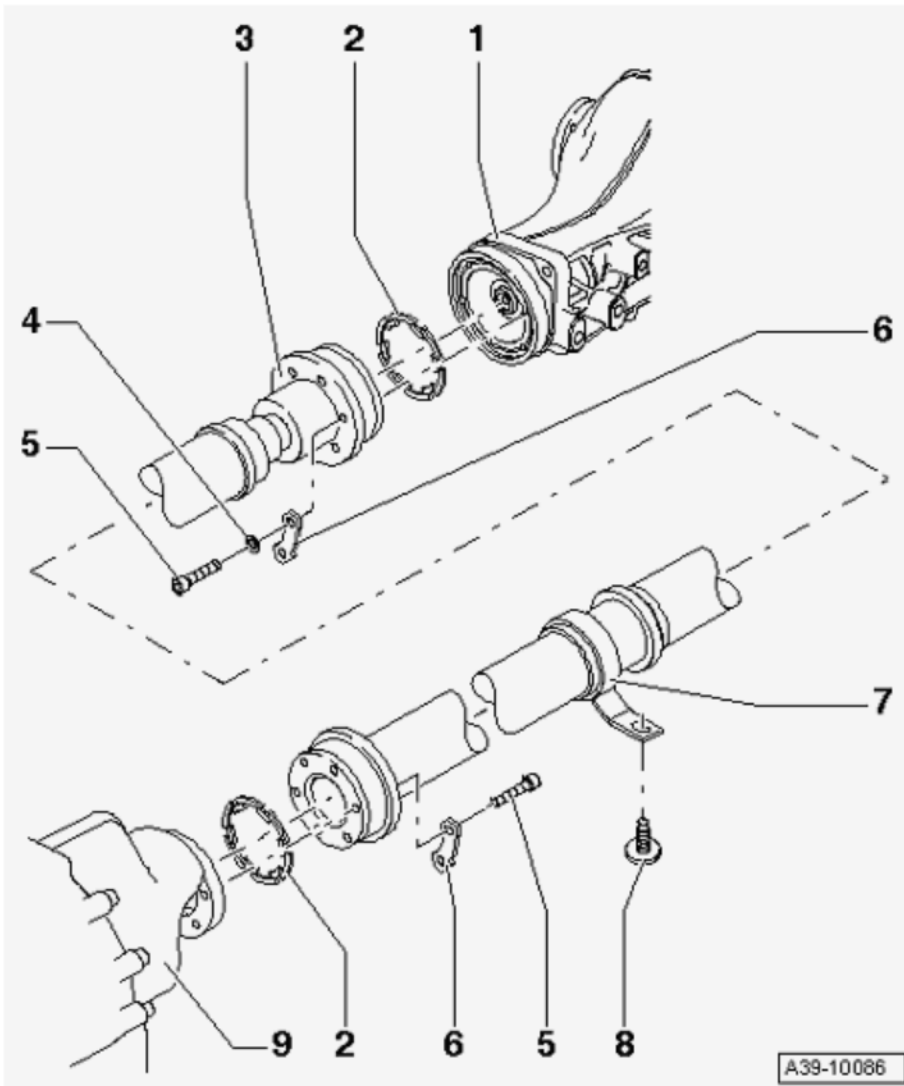


Fig. 7: Driveshaft, Servicing Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Rear final drive

- Removing and installing Audi A4, Audi A6 --> **Rear final drive, removing and installing**
- Removing and installing Audi A8 --> **Rear final drive (Audi A8), removing and installing**

2 - Gasket

- Replace
- Pull off protective foil
- Remove grease from flange shaft and adhere seal.

3 - Driveshaft

- Removing and installing Audi A4, Audi A6 --> **Driveshaft (Audi A4 and Cabriolet, Audi A6), removing and installing**
- Removing and installing Audi A8 --> **Driveshaft, removing and installing - Audi A8**

4 - Balancing washer

- Not present on every vehicle
- If present, this balancing washer must no longer be installed after disconnecting driveshaft from rear final drive.

5 - Socket head bolt, 55 Nm

- Self-locking
- Always replace
- Threaded holes for bolts in drive flanges must always be cleaned. (e.g. using a tap)
- Loosened and tightened with parking brake engaged.

6 - Backing plate

7 - Intermediate bearing

8 - Hex bolt, 25 Nm

9 - Transmission

Driveshaft (Audi A4 and Cabriolet, Audi A6), removing and installing

Special tools, testers and auxiliary items required

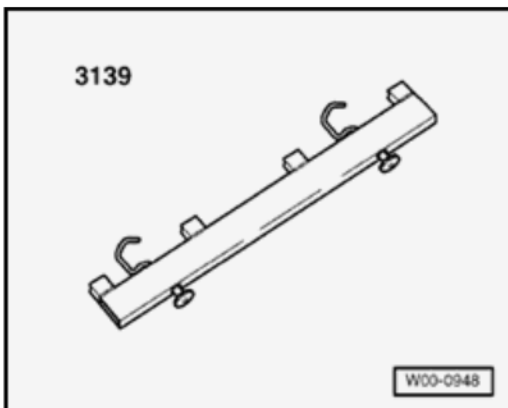
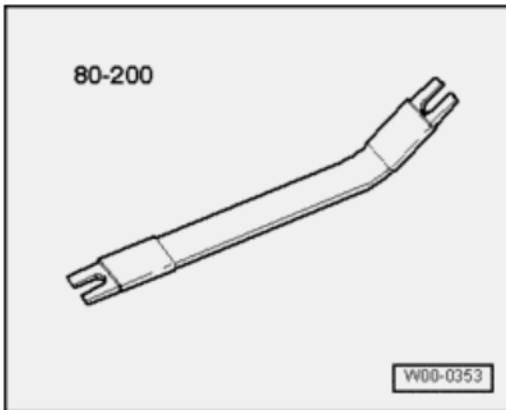


Fig. 8: Assembly Tool 3139

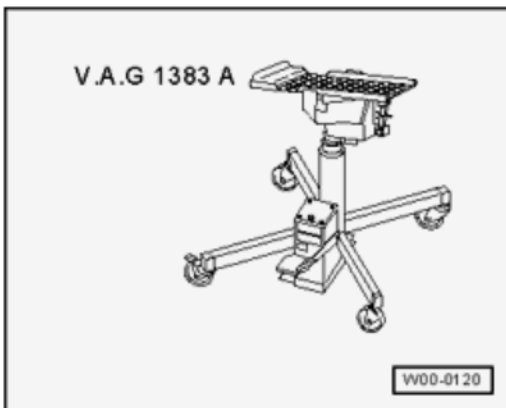
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Assembly tool 3139

**Fig. 9: Identifying Pry Lever 80-200**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry lever 80 - 200

**Fig. 10: Identifying Engine/Transmission Jack V.A.G. 1383 A**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack V.A.G 1383 A with universal transmission support V.A.G 1359/2

Driveshaft (Audi A4 and Cabriolet, Audi A6), removing

- See notes --> **Driveshaft, servicing overview**
- The driveshaft should only be worked on a two column lift.

Audi A4, Audi Cabriolet:

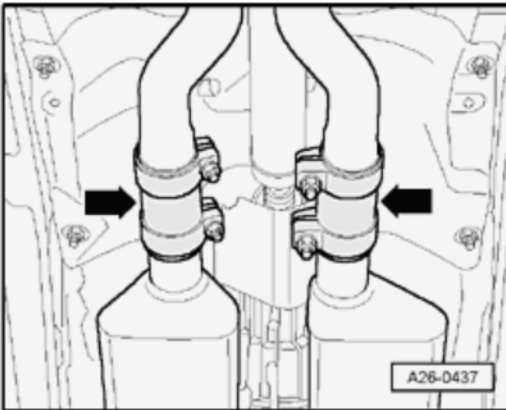


Fig. 11: Loosening Clamping Sleeves

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear part of exhaust system from clamping sleeves - **arrows** - -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

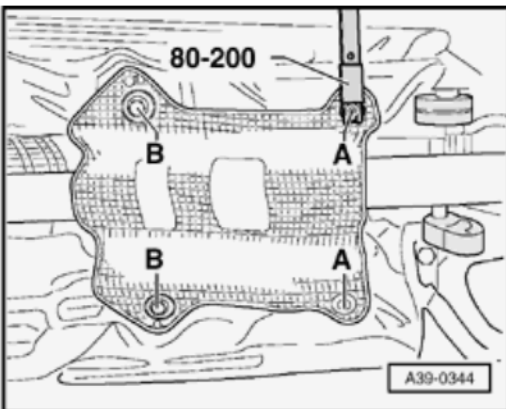


Fig. 12: Using Press Lever - RMV Outside Mirror 80-200 To Pry Off Rear Attachments Of Heat Shield For Drive Shaft & Removing Securing Bolts For Center Bearing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off mountings - **A** - for heat shield above intermediate bearing.
- Remove mounting bolts for intermediate bearing - **B** -. When doing this, support driveshaft by hand.
- Remove heat shield while supporting driveshaft.
- Install mounting bolts for intermediate bearing by hand.

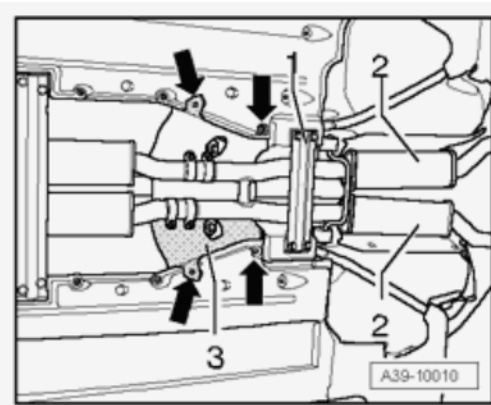
Audi A6:

Fig. 13: Removing Rear Transverse Beam & Heat Shield From Vehicle Floor
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If present, remove rear transverse beam - **1** -.
- Remove heat shield - **3** - from vehicle floor - **arrows** -.

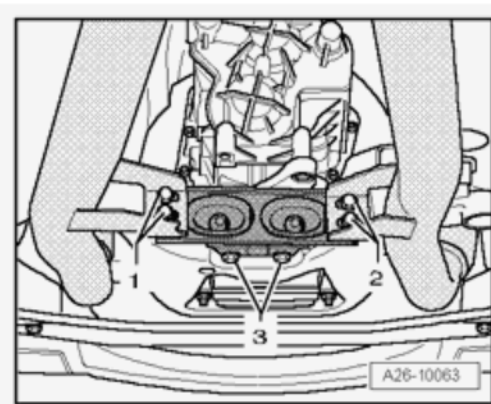
Continuation for all vehicles:

Fig. 14: Removing Mounting Bolts For Front Exhaust Pipes
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If present, remove mounting bolts for front exhaust pipes - **1** - and - **2** -.

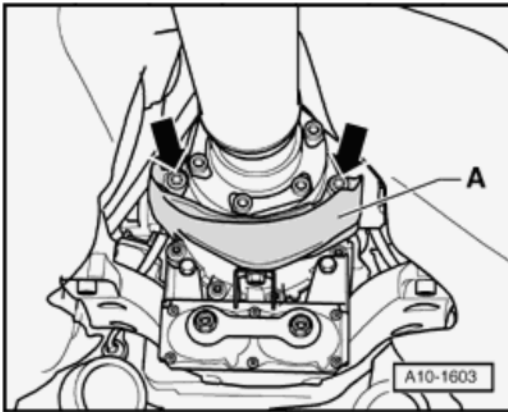


Fig. 15: Removing/Installing Shielding Plate From Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove shielding plate - **A** - from transmission - **arrows** -.
- Check whether there is a marking (colored marking) on driveshaft and at flange/driveshaft at rear final drive.

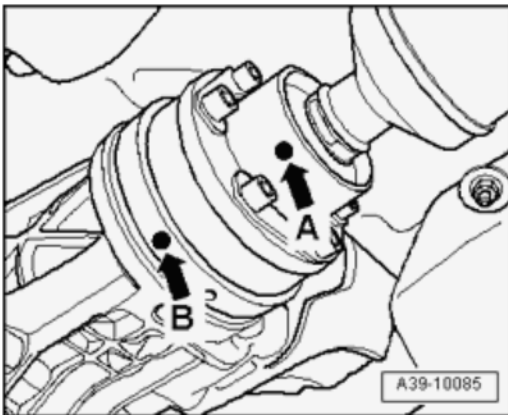


Fig. 16: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If this marking is not present, then mark in color the position of driveshaft flange - **arrow A** - to rear final drive - **arrow B** -.

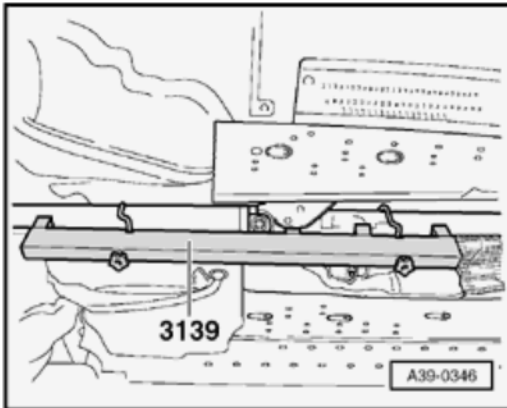


Fig. 17: Attaching Alignment Fixture - 4W Dr. Shaft 3139
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach Alignment Fixture - 4W Dr. Shaft 3139 and tighten plastic nuts.

NOTE:

- Never set alignment fixture on balance plates.

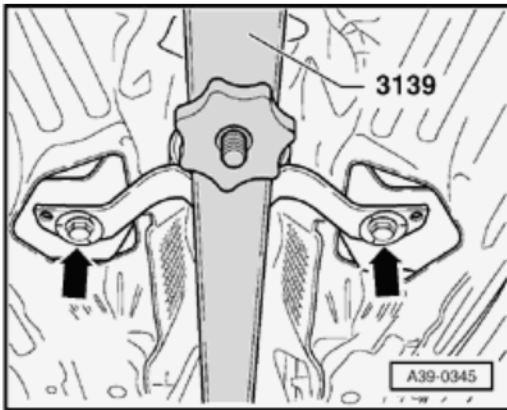


Fig. 18: Removing/Installing Securing Bolts For Center Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bolts - **arrows** - for intermediate bearing.

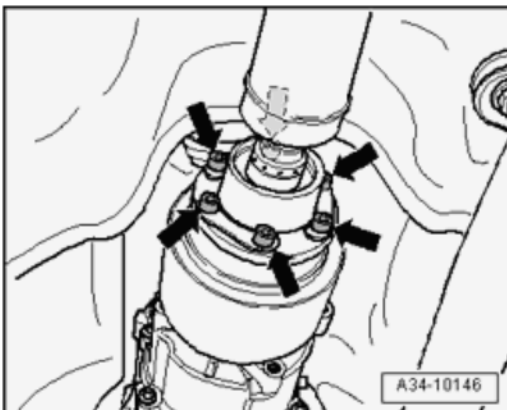


Fig. 19: Locating Bolts At Transmission/Drive Shaft Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen securing bolts of front driveshaft - **arrows** -.
- Remove driveshaft from transmission and support it using engine/transmission jack V.A.G 1383 A.

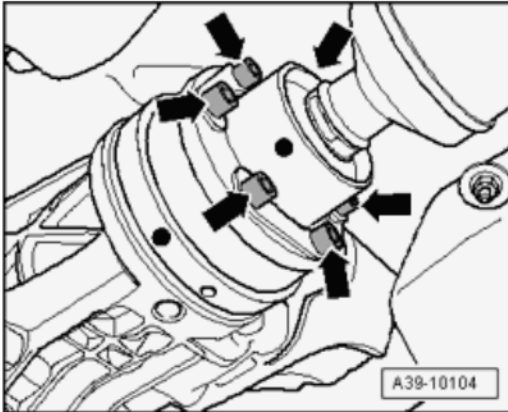


Fig. 20: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bolts - **arrows** - on rear CV joint and remove driveshaft.

NOTE: • **Only store and move driveshaft fully extended.**

Installing driveshaft - Audi A4 and Cabriolet, Audi A6

Installation is in reverse order of removal. Note the following:

- Remove old and dry high-temperature grease from CV joints and flanges for driveshaft. Fill the exact same amount of new grease G 000 633.
- Always remove any remaining locking fluid from thread bores in drive flanges for transmission driveshaft and for rear final drive. Cleaning can be performed with a tap. Otherwise, the securing bolts can shear while installing.
- After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and a mounting bolt may not be reinstalled.
- Always replace (self-locking) securing bolts for driveshaft.
- Note installation position of driveshaft: Center CV joint is located behind intermediate bearing in direction facing the rear final drive.

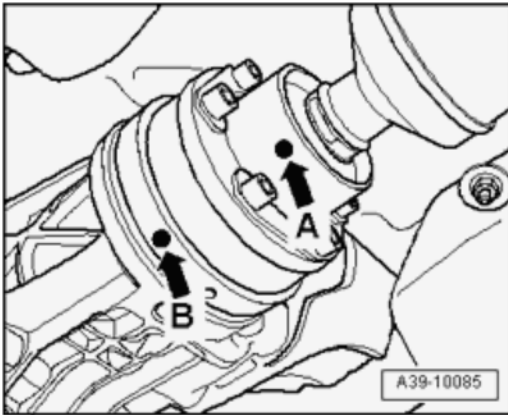


Fig. 21: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Make sure that the markings on flange for driveshaft - **arrow A** - and for transmission/rear final drive - **arrow B** - line up.
- If a new driveshaft is installed and the factory marking on the rear final drive flange is no longer visible, check radial run out at flange/driveshaft --> **Measure radial play at flange/driveshaft and mark** and adjust color marking at new driveshaft to new marking at flange/driveshaft.
- Replace seals for driveshaft at transmission/rear final drive flange. Remove grease from sealing surfaces and adhere new seals.
- Insert driveshaft and install with new bolts for CV joint.

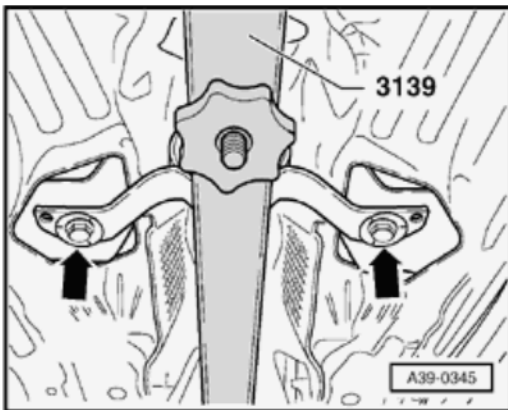


Fig. 22: Removing/Installing Securing Bolts For Center Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install mounting bolts - **arrows** - far enough that intermediate bearing can still be moved.

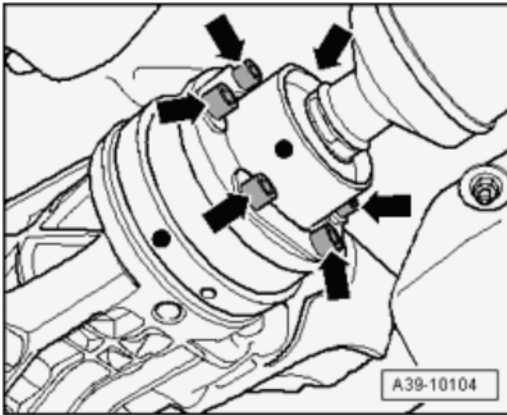


Fig. 23: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts - **arrows** - of driveshaft at rear final drive to tightening torque.

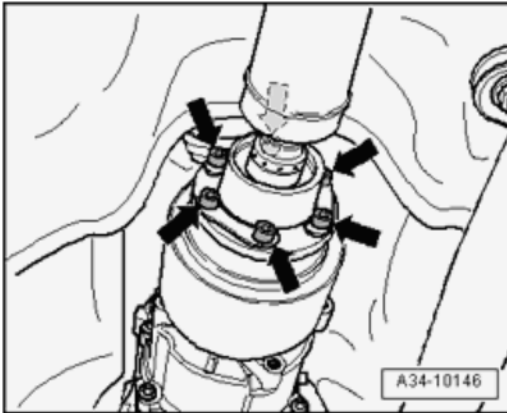


Fig. 24: Locating Bolts At Transmission/Drive Shaft Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts - **arrows** - of front driveshaft to tightening torque.
- Remove alignment fixture 3139.

Audi A4, Audi Cabriolet:

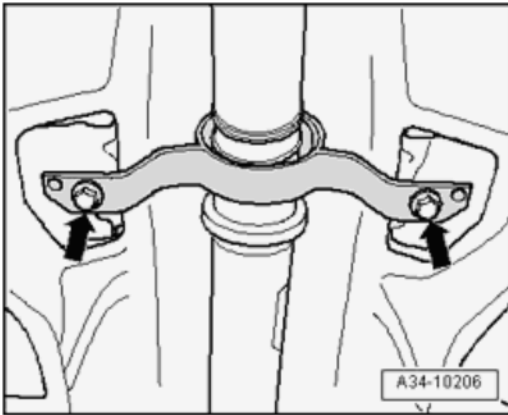


Fig. 25: Removing Mounting Bolts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bolts - **arrows** -. When doing this, driveshaft must be supported by a second technician.

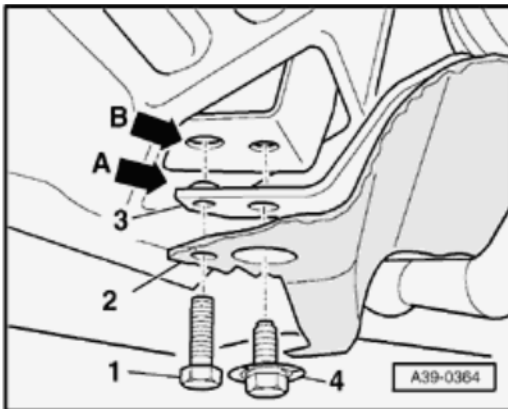


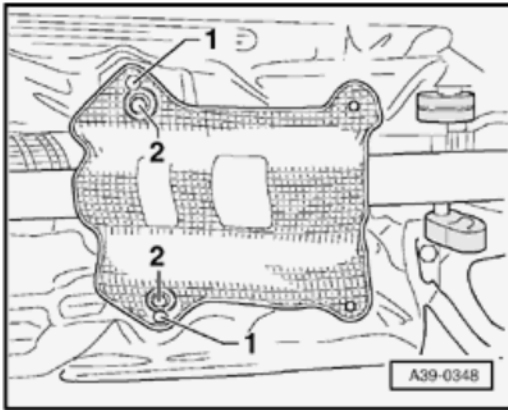
Fig. 26: Installing Heat Shield, Screwing In Securing Bolts For Left/Right Center Bearing & Heat Shield On Right/Left At Center Bearing Using Bolts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert heat shield - **2** -. Continue to support driveshaft while doing this.
- Install mounting bolts - **4** - on left and right a few more turns.
- Secure heat shield - **2** - on left and right with a bolt - **1** - (M8x30) on intermediate bearing - **3** -.

NOTE:

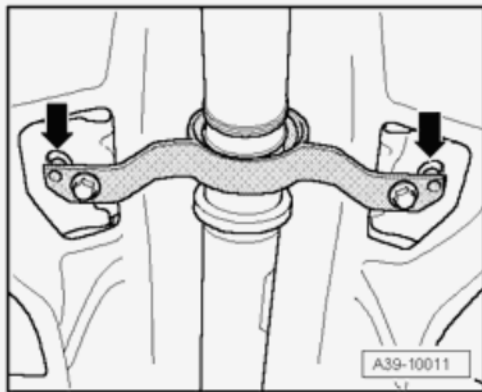
- When tightening the combination bolt - **4** -, make sure that centering element - arrow **A** - is located in the locating hole - arrow **B** -.

**Fig. 27: Installing Heat Shield**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts - 2 - of intermediate bearing for driveshaft on to body free of tension. Torque
- Remove bolts - 1 -.
- Remove mounting bolts for intermediate bearing - B -. When doing this, support driveshaft by hand.
- Insert mounting clips for heat shield.

Audi A6:

**Fig. 28: Tightening Bolts Of Intermediate Bearing For Driveshaft On To Body Tightening Torque**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts of intermediate bearing for driveshaft on to body tightening torque. While doing this, centering elements of intermediate bearing must be located in the locating holes - **arrows** -.

Continuation for all vehicles:

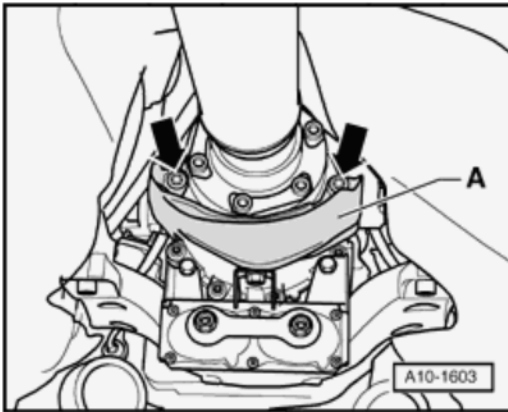


Fig. 29: Removing/Installing Shielding Plate From Transmission
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts of shielding plate - A - on to transmission - **arrows** -.

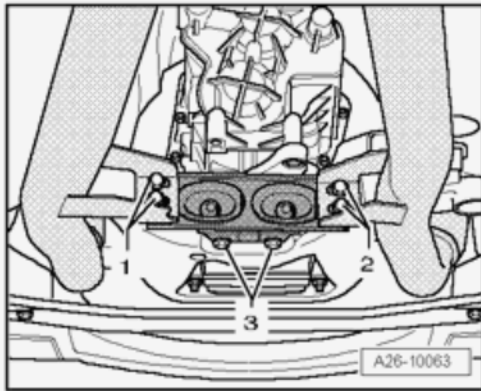


Fig. 30: Removing/Installing Mounting Bolts For Front Exhaust Pipes
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If present, tighten bolts of front exhaust pipes - 1 - and - 2 -.

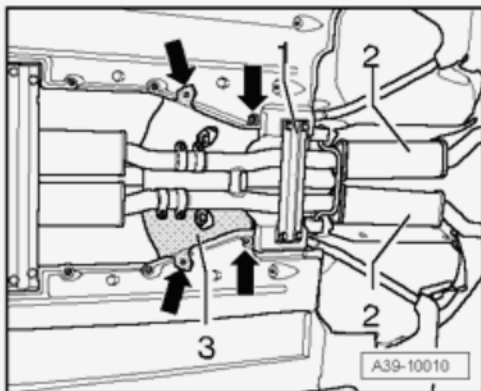


Fig. 31: Removing/Installing Rear Transverse Beam & Heat Shield From Vehicle Floor
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If present, tighten bolts of heat shield - **3** - on to vehicle floor - **arrows** -.
- Install rear part of exhaust system - **2** - -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- If present, install rear transverse beam - **1** - --> **40 - FRONT SUSPENSION** .

Tightening torques

Component	Nm
Heat shield for driveshaft to transmission	25

Driveshaft, removing and installing - Audi A8

Special tools, testers and auxiliary items required

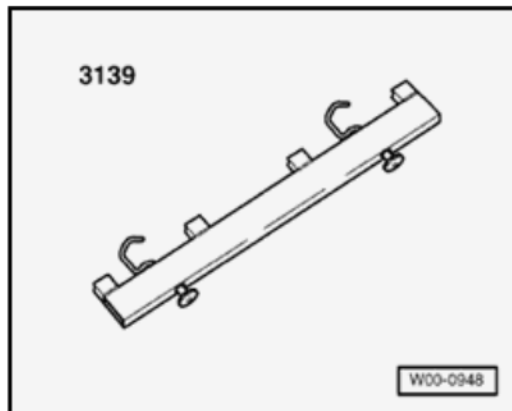


Fig. 32: Assembly Tool 3139

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Assembly tool 3139

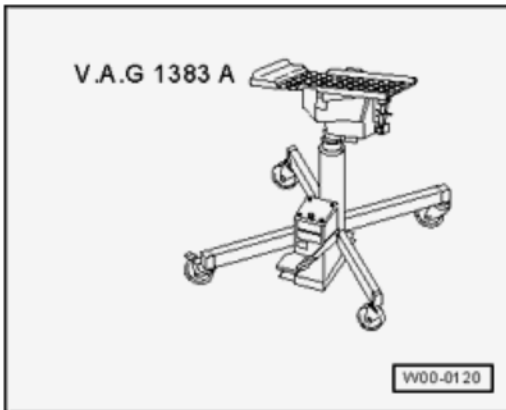


Fig. 33: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack V.A.G 1383 A with universal mount V.A.G 1359/2

Removing driveshaft - Audi A8

Removing

See notes --> Driveshaft, servicing overview.

NOTE:

- The driveshaft should only be worked on a two column lift.

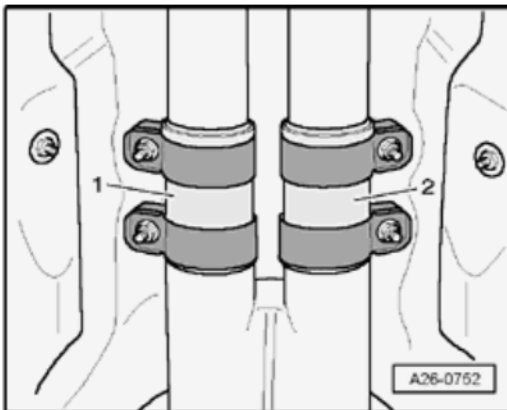


Fig. 34: Disconnecting Exhaust System At Clamping Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect exhaust system at clamping sleeves - 1 - and - 2 -.

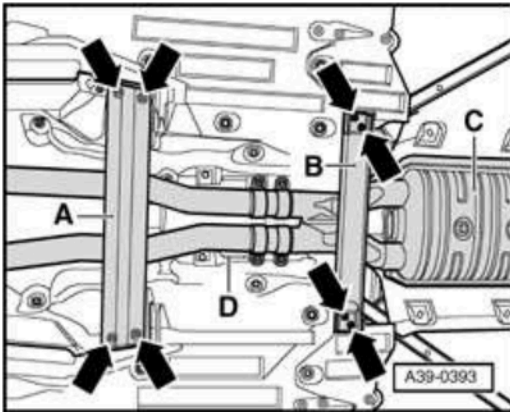


Fig. 35: Removing Tunnel Braces & Rear Part Of Exhaust System
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove both tunnel braces - A - and - B -.
- Remove rear part of exhaust system - C - -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

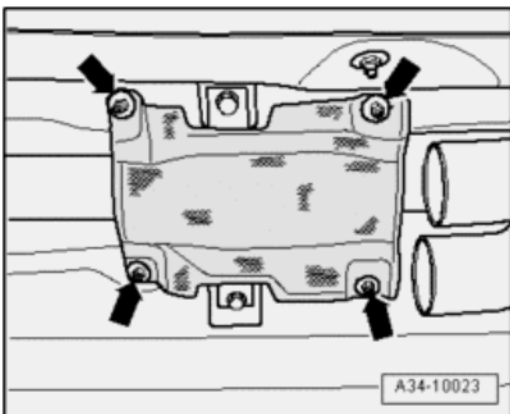


Fig. 36: Removing Heat Shield
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **arrows** -.
- Remove primary catalytic converter -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

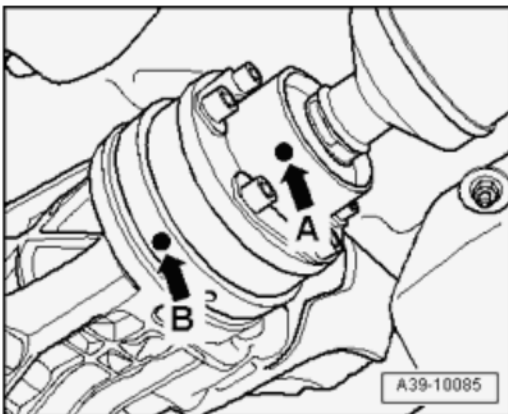


Fig. 37: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether there is a marking (colored marking) on driveshaft and at flange/driveshaft at rear final drive - **arrows A and B** -.
- If these markings are not present, mark in color the position of driveshaft flange - **arrow A** - to rear final drive - **arrow B** -.

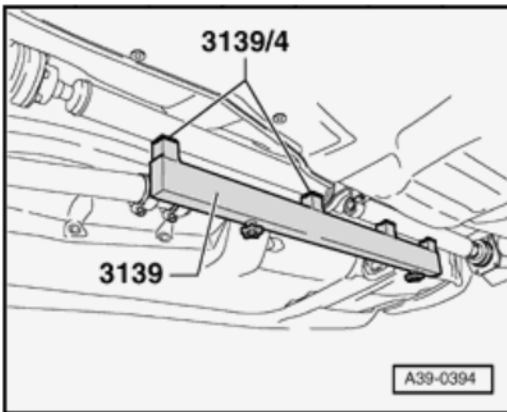


Fig. 38: Attaching Alignment Fixture - 4W Dr. Shaft 3139 With Spacers 3139/4
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach Alignment Fixture - 4W Dr. Shaft 3139 with Spacers 3139/4 and tighten plastic nuts.

NOTE:

- Never set alignment fixture on balance plates.

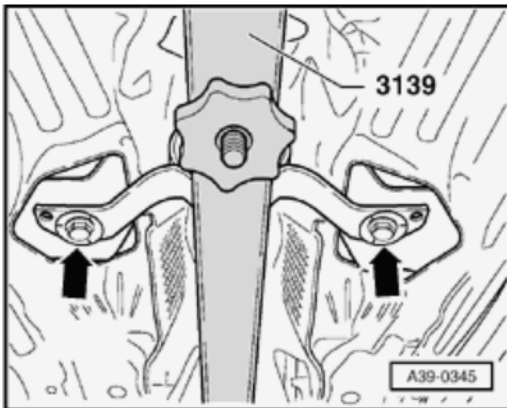


Fig. 39: Removing/Installing Securing Bolts For Center Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bolts - **arrows** - for intermediate bearing.

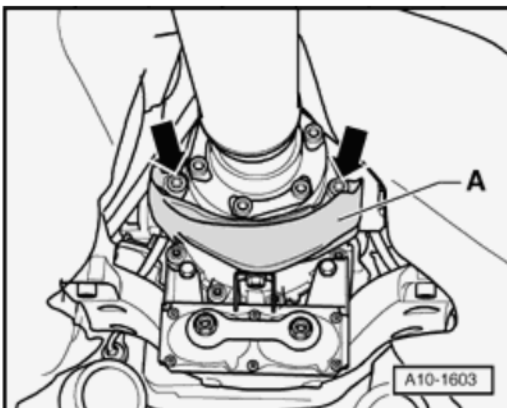


Fig. 40: Removing/Installing Shielding Plate From Transmission
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **A** - from transmission - **arrows** -.

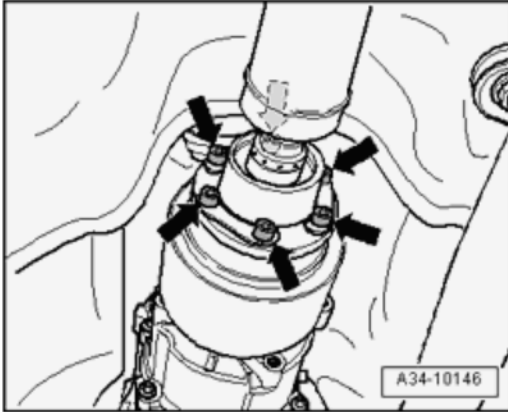


Fig. 41: Locating Bolts At Transmission/Drive Shaft Flange
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen securing bolts of front driveshaft - **arrows** - , to do so engage parking brake.
- Remove driveshaft from transmission and support it using engine/transmission jack V.A.G 1383 A.

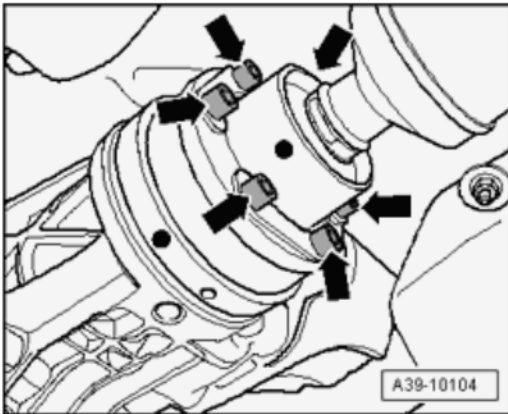


Fig. 42: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bolts - **arrows** - on rear CV joint, to do so engage parking brake.
- Remove driveshaft.

NOTE:

- **Only store and move driveshaft fully extended.**

Installing driveshaft - Audi A8

Installation is performed in reverse order of removal. Note the following:

- Remove old and dry high-temperature grease from CV joints and flanges for driveshaft. Fill the exact same amount of new grease G 000 633.
- Always remove any remaining locking fluid from thread bores in drive flanges for transmission driveshaft and for rear final drive. Cleaning can be performed with a tap. Otherwise, the securing bolts can shear while installing.
- After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and a mounting bolt may not be reinstalled.
- Always replace (self-locking) securing bolts for driveshaft.
- Note installation position of driveshaft: Center CV joint is located behind intermediate bearing in direction facing rear final drive.

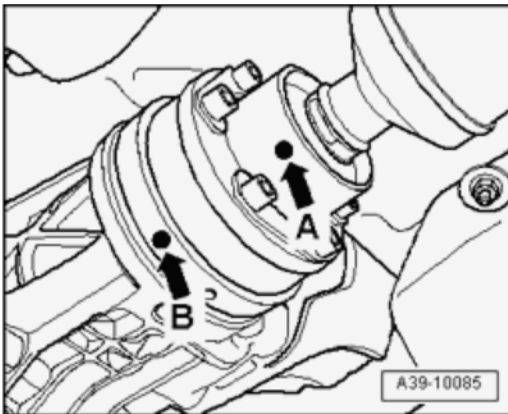


Fig. 43: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Make sure that the markings on flange for driveshaft - **arrow A** - and for transmission/rear final drive - **arrow B** - line up.
- If a new driveshaft is installed and the factory marking on the rear final drive flange is no longer visible, check radial run out at flange/driveshaft --> **Measure radial play at flange/driveshaft and mark** and adjust color marking at new driveshaft to new marking at flange/driveshaft.
- Replace seals for driveshaft at transmission/rear final drive flange. Remove grease from sealing surfaces and adhere new seals.
- Insert driveshaft and install with new bolts for CV joint.

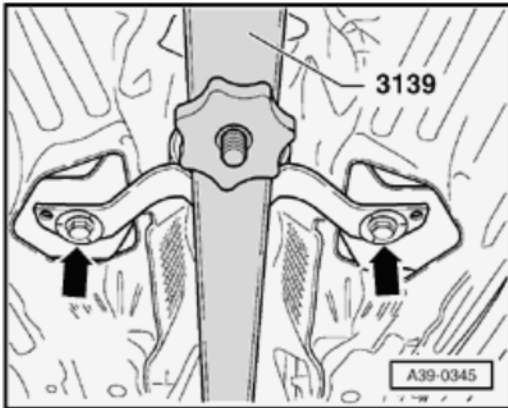


Fig. 44: Removing/Installing Securing Bolts For Center Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install mounting bolts - **arrows** - far enough that intermediate bearing can still be moved.

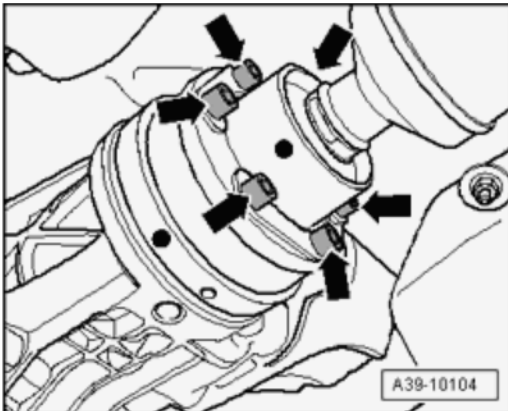


Fig. 45: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts - **arrows** - of driveshaft at front and rear to tightening torque.
- Remove alignment fixture 3139.

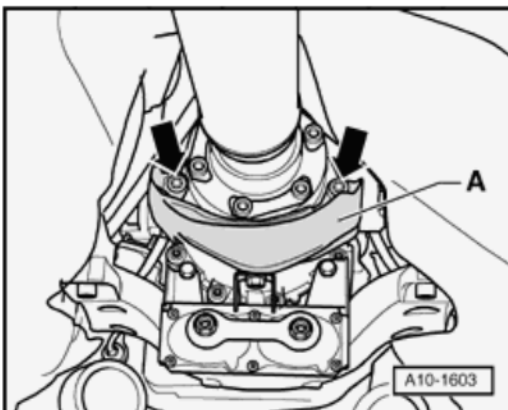


Fig. 46: Removing/Installing Shielding Plate From Transmission

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **A** - - **arrows** -.

Align intermediate bearing as follows:

- Slightly loosen mounting bolt for intermediate bearing.

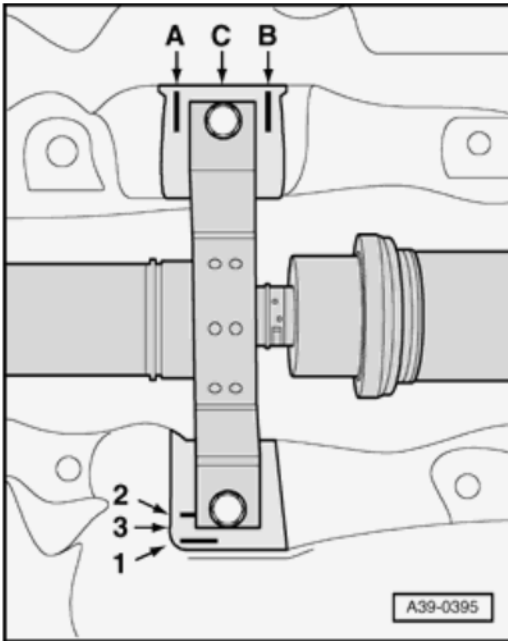


Fig. 47: Sliding Driveshaft Toward Front, Rear, Right, Left Until It Stops And Mark Position Of Intermediate Bearing On Body & Aligning Driveshaft

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide driveshaft toward front until it stops and mark position of intermediate bearing on body - **arrow A** -.
- Slide driveshaft toward rear until it stops and mark position of intermediate bearing on body - **arrow B** -.
- Slide driveshaft toward right until it stops and mark position of intermediate bearing on body - **arrow 1** -.
- Slide driveshaft toward left until it stops and mark position of intermediate bearing on body - **arrow 2** -.
- Align driveshaft - **arrow C** - and - **arrow 3** -.
- Center bearing must stand centered between markings - **arrow A** - and - **arrow B** - , and - **arrow 1** - and - **arrow 2** -.
- Tighten mounting bolts of intermediate bearing to tightening torque.

Continuation:

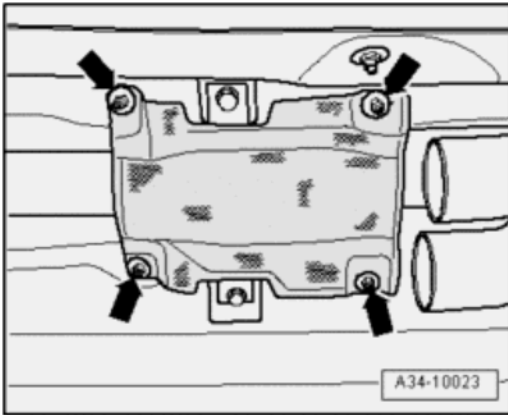


Fig. 48: Removing Heat Shield

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install heat shield above intermediate bearing - **arrows** -.
- Install and adjust exhaust system free of stress -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

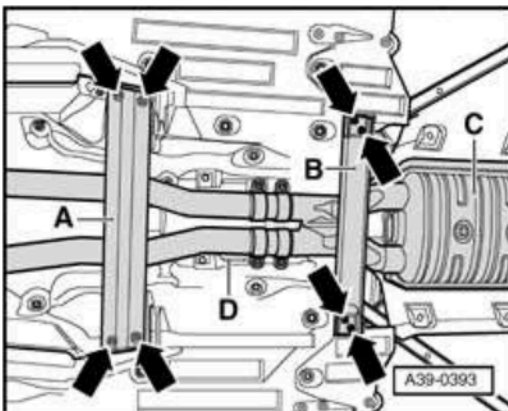


Fig. 49: Removing Tunnel Braces & Rear Part Of Exhaust System

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install both tunnel braces - **A** - and - **B** - -->
 - **66 EXTERIOR EQUIPMENT**
 - **66 - EXTERIOR EQUIPMENT** for BODY EXTERIOR - CABRIOLET

Tightening torques

Component	Nm
Heat shield for driveshaft to transmission	25

Driveshaft, disconnecting from rear final drive

- See notes --> **Driveshaft, servicing overview**
- The driveshaft should only be worked on a two column lift.

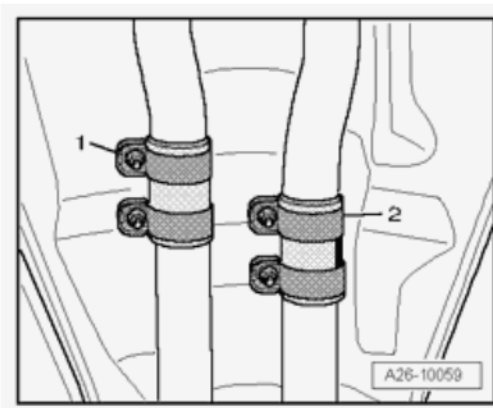


Fig. 50: Loosening Clamping Sleeves And Removing Rear Part Of Exhaust System
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen clamping sleeves - **1** - and - **2** - and remove rear part of exhaust system -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

- Check whether there is a marking (colored marking) on driveshaft and at flange/driveshaft at rear final drive.

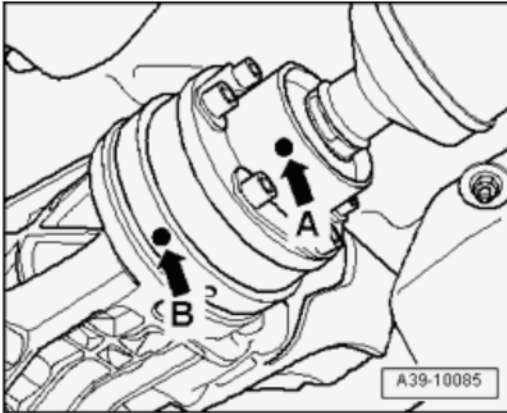


Fig. 51: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If this marking is not present, then mark in color the position of driveshaft flange - **arrow A** - to rear final drive - **arrow B** -.

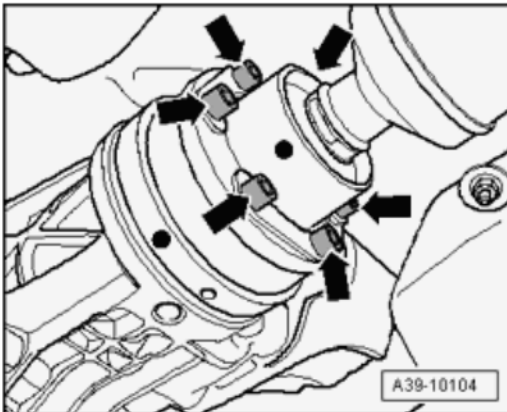


Fig. 52: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bolts - **arrows** - on rear CV joint with parking brake engaged and remove driveshaft.

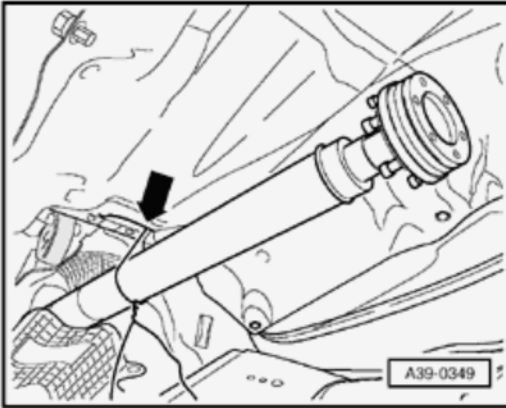


Fig. 53: Disconnecting Driveshaft From Rear Final Drive And Tie Up To Side
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect driveshaft from rear final drive and tie up to side - **arrow** -.

Driveshaft, securing to rear final drive

Installation is in reverse order of removal. Note the following:

- Remove old and dry high-temperature grease from CV joint and flange for driveshaft. Fill the exact same amount of new grease G 000 633.
- Threaded holes in flange shaft at rear final drive must be cleaned of locking compound residue. Cleaning can be performed with a tap. Otherwise, the securing bolts can shear while installing.
- After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and a mounting bolt may not be reinstalled.
- Always replace (self-locking) securing bolts for driveshaft.
- Replace seal for driveshaft at rear final drive flange. Remove grease from sealing surfaces and adhere new seal.
- Insert driveshaft and install bolts for CV joint.

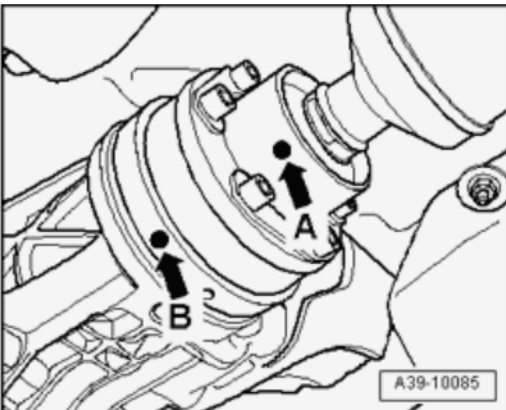


Fig. 54: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Make sure that the markings on flange for driveshaft - **arrow A** - and for rear final drive - **arrow B** - line up.

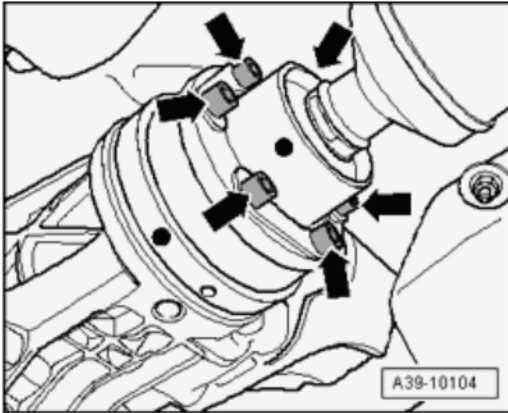


Fig. 55: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts - **arrows** - of driveshaft at rear final drive to tightening torque.
- Install rear part of exhaust system -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

MEASURE RADIAL PLAY AT FLANGE/DRIVESHAFT AND MARK

Measure radial play at flange/driveshaft and mark

Special tools, testers and auxiliary items required

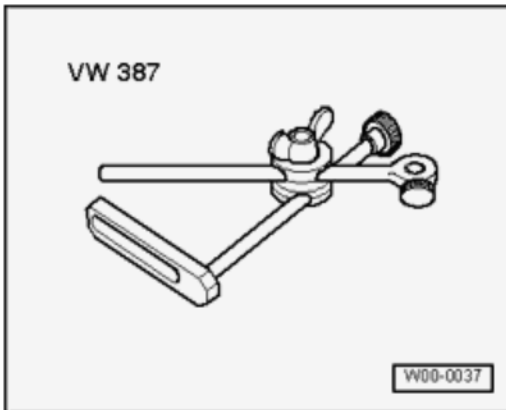


Fig. 56: Identifying Dial Gauge Holder VW 387

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Dial gauge holder VW 387
- Dial gauge
- Bolt M10x30

NOTE:

- Radial run-out must always be measured if the flange/driveshaft at rear final drive was removed. For this, make new color marking and remove old color marking.
- If a new driveshaft is installed and the color marking on the drive flange of the rear final drive is no longer visible, location of largest radial run-out (corresponding to greatest distance from turning axis) must be determined and marked with a color marking.

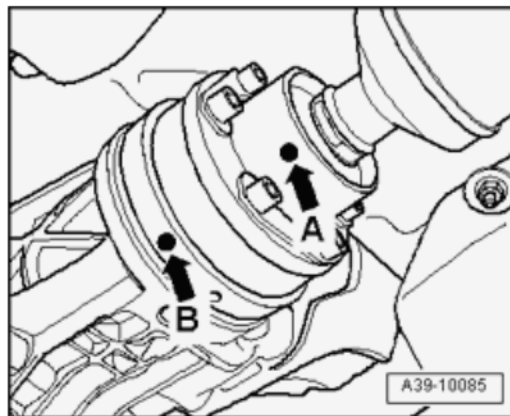


Fig. 57: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- This color marking - arrow A - is set opposite the color marking on the driveshaft - arrow B -.
- Radial run-out can be measured with rear final drive installed.

- Remove driveshaft from rear final drive --> **Driveshaft, disconnecting from rear final drive.**

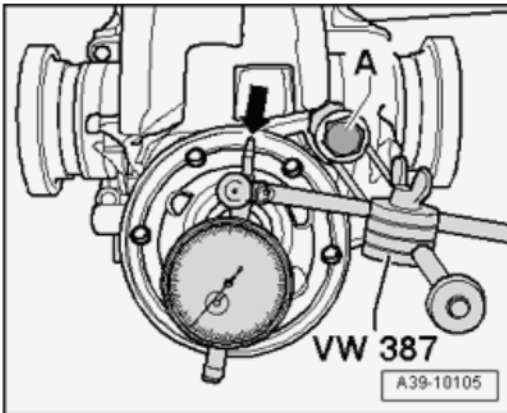


Fig. 58: Securing Measuring Tools With Bolt To Rear Final Drive & Setting Dial Indicator Onto Ground Diameter In Inside Of Driveshaft Flange

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure measuring tools with bolt - A - (M10x30) to rear final drive.
- Set dial indicator onto ground diameter in inside of driveshaft flange - **arrow** - and set to "0" with 1 mm preload.
- Rotate both rear wheels simultaneously in one direction and thereby turn flange through one complete rotation.
- Mark largest radial run-out on outer edge of flange with colored marking (equivalent to largest distance from turning axis).
- Then remove previous marking from flange.
- Install driveshaft.

AXLE OIL IN REAR FINAL DRIVE, CHECKING

Axle oil in rear final drive, checking

Special tools, testers and auxiliary items required

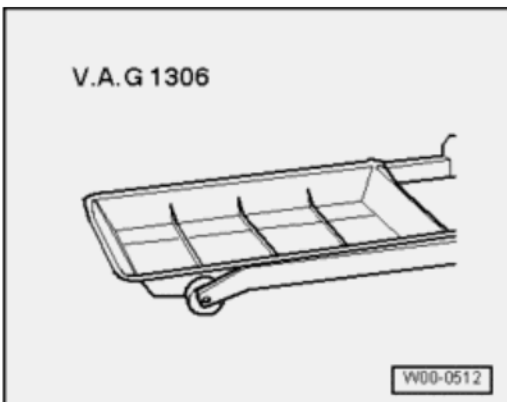


Fig. 59: Identifying Drip Tray V.A.G 1306

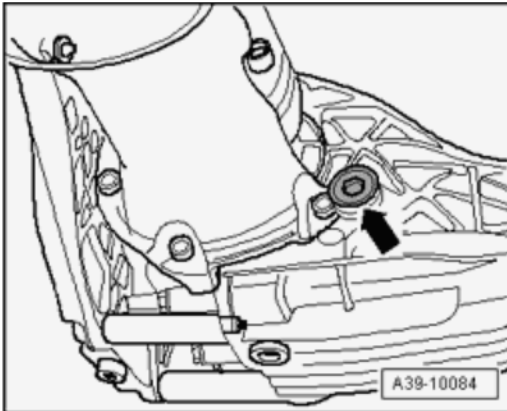
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray V.A.G 1306

**Fig. 60: Identifying Torque Wrench V.A.G. 1331**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench V.A.G 1331

**Fig. 61: Removing Sealing Plug For Checking Transmission Fluid**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove sealing plug for checking transmission fluid - **arrow** -.

Oil level is correct when rear final drive is filled up to lower edge of oil filler hole.

- Transmission oil specification: Capacities and specification - Audi A4 2002 >, Cabriolet 2003 > --> **Code letters, aggregate allocation, ratios, capacities, Audi A4 2002 >, Cabriolet 2003 >** , Audi A6 2005 > --> **Code letters, aggregate allocation, ratios, capacities, Audi A6 2005 >** , Audi A8 2004 > --> **Code letters, aggregate allocation, ratios, capacities, Audi A8 2004 >**
- Install screw plug - **arrow** - and tighten.

Tightening torque: 45 Nm

REAR FINAL DRIVE, REMOVING AND INSTALLING

Rear final drive, removing and installing

Rear final drive (Audi A4 and Cabriolet, Audi A6), overview --> **Rear final drive (Audi A4 and Cabriolet, Audi A6), overview**

Rear final drive (Audi A4 and Cabriolet, Audi A6), removing and installing --> **Rear final drive (Audi A4 and Cabriolet, Audi A6), removing and installing**

Rear final drive (Audi A8), overview --> **Rear final drive (Audi A8), overview**

Rear final drive (Audi A8), removing and installing --> **Rear final drive (Audi A8), removing and installing**

Rear final drive (Audi A4 and Cabriolet, Audi A6), overview

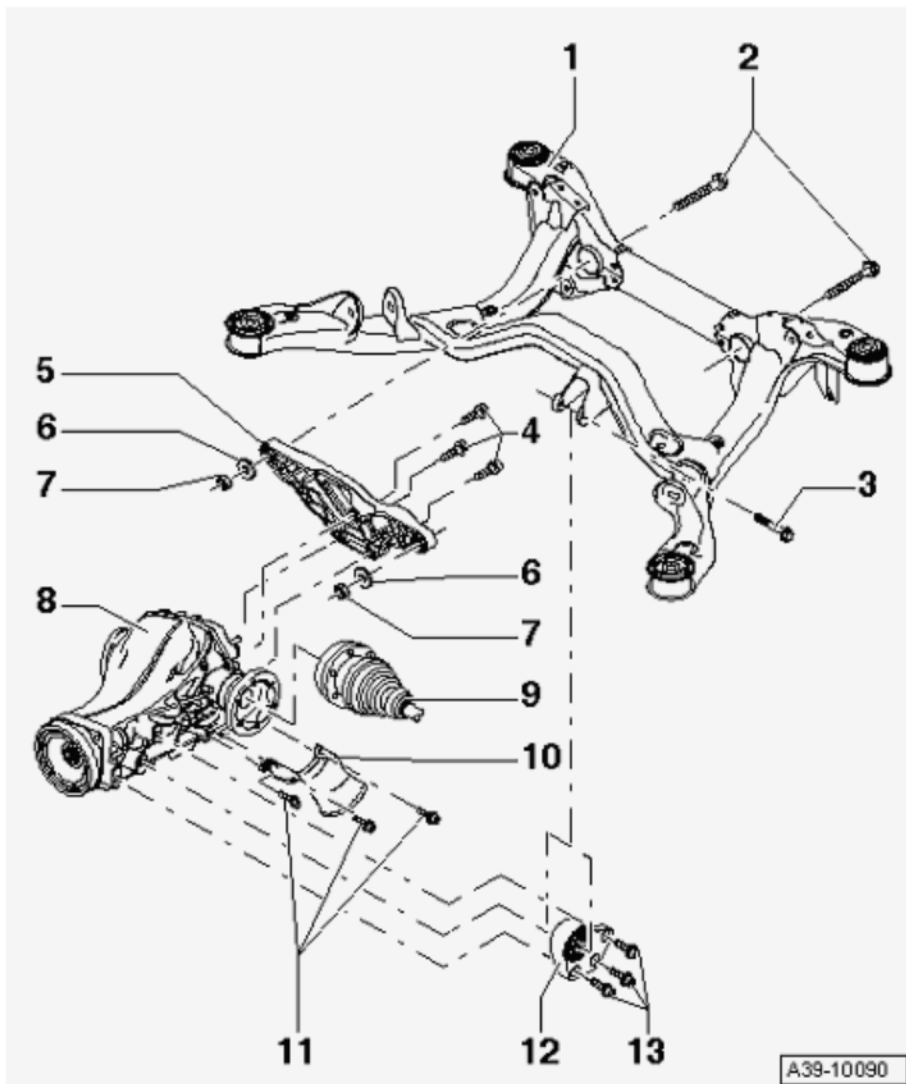


Fig. 62: Rear Final Drive (Audi A4 And Cabriolet, Audi A6), Overview
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Subframe

- Removing and installing --> **42 - REAR SUSPENSION**

2 - Hex bolt

3 - Hex bolt, 40 Nm

- For transmission support on subframe
- If present, replace nut

4 - Hex socket head bolt, 40 Nm

5 - Rear cross member

6 - Washer

7 - Nut

- Self-locking
- Replace
- Tightening torque --> **42 - REAR SUSPENSION**

8 - Rear final drive

- Removing and installing --> **Rear final drive (Audi A4 and Cabriolet, Audi A6), removing and installing**

9 - Drive axle

- Removing and installing --> **42 - REAR SUSPENSION**

10 - Heat shield

11 - Hex socket head bolt, 25 Nm

12 - Transmission support

13 - Hex socket head bolt, 40 Nm

Rear final drive (Audi A4 and Cabriolet, Audi A6), removing and installing

Special tools, testers and auxiliary items required

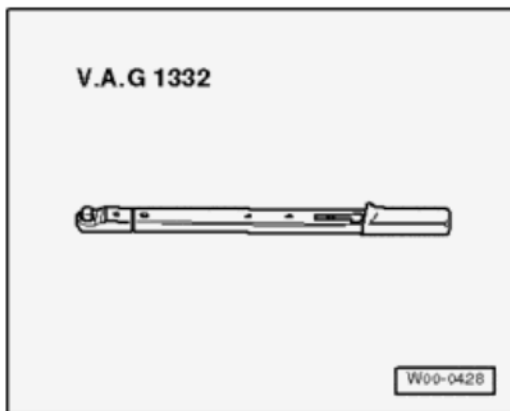


Fig. 63: Identifying Torque Wrench V.A.G. 1332

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench V.A.G 1332

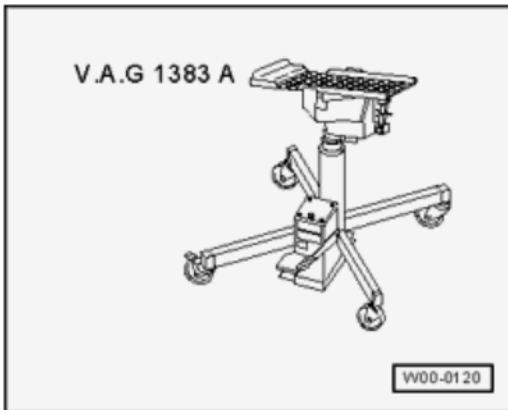


Fig. 64: Identifying Engine/Transmission Jack V.A.G. 1383 A
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack V.A.G 1383 A with universal transmission support V.A.G 1359/2

Removing

Observe general repair notes --> **General Repair Notes.**

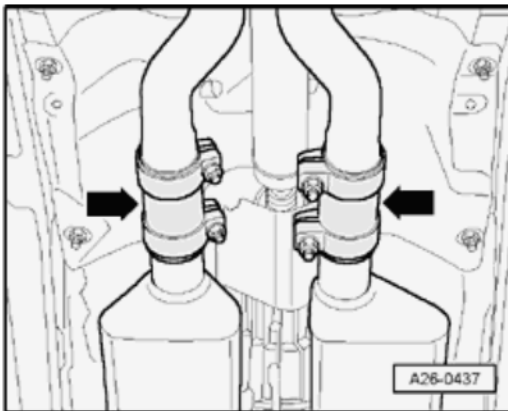


Fig. 65: Loosening Clamping Sleeves
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear part of exhaust system from clamping sleeves - **arrows** - -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE

MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE
MECHANICAL, ENGINE CODE(S): BHF

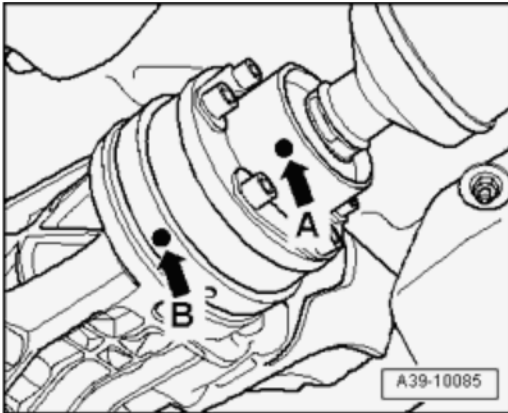


Fig. 66: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether there is a marking (colored marking) on driveshaft and at flange/driveshaft at rear final drive.
- If this marking is not present, then mark in color the position of driveshaft flange - **arrow A** - to rear final drive - **arrow B** -.

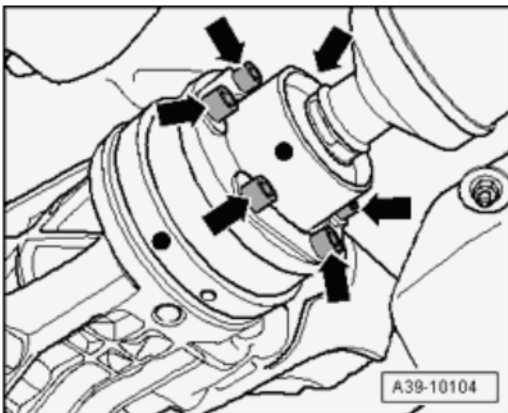


Fig. 67: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove driveshaft from rear final drive - **arrows** -.

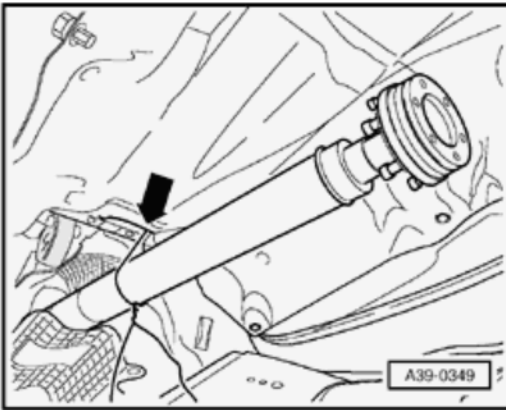


Fig. 68: Disconnecting Driveshaft From Rear Final Drive And Tie Up To Side
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect driveshaft from rear final drive and tie up to side - **arrow** -.

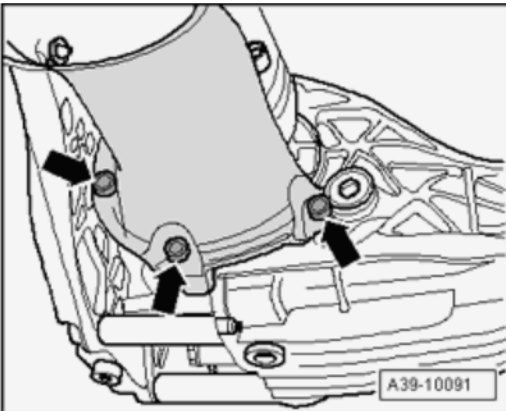


Fig. 69: Removing/Installing Right/Left Shielding Plates From Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right and left shielding plates from rear final drive - **arrows** -.
- Remove left and right drive axles.

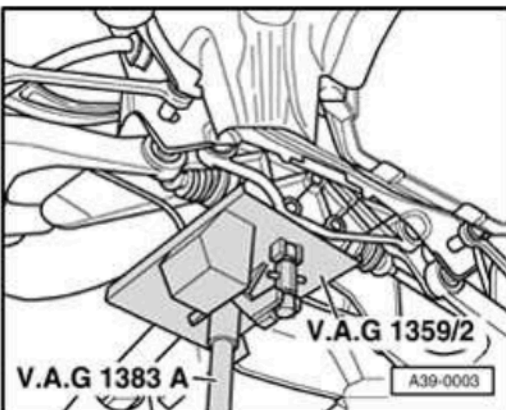


Fig. 70: Place Engine/Transmission Jack V.A.G 1383 A With Universal Transmission Support V.A.G

1359/2 Under Final Drive And Secure Final Drive

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place Engine/transmission jack V.A.G 1383 A with universal transmission support V.A.G 1359/2 under rear final drive.
- Secure rear final drive using strap to universal transmission support.

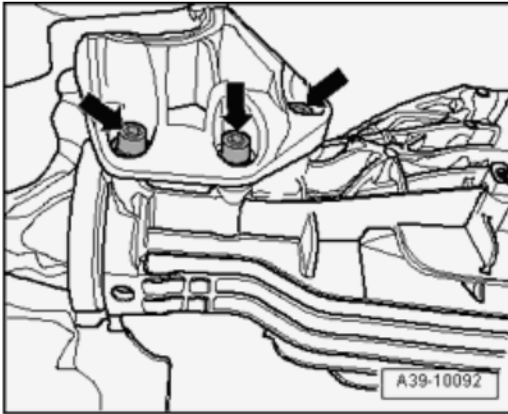


Fig. 71: Removing/Installing Securing Bolts From Transmission Support

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts - **arrows** - from transmission support.

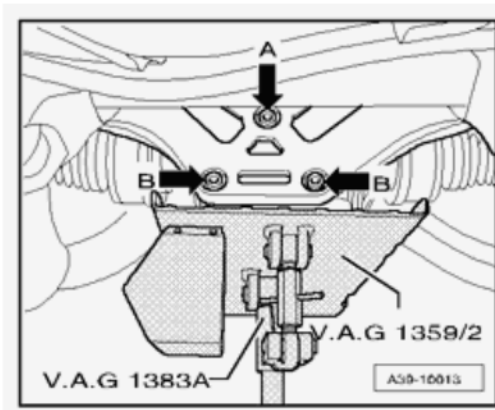


Fig. 72: Removing/Installing Mounting Bolts From Cross Member

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bolts - **arrow A** - and - **arrows B** - from cross member.

Bolt - **arrow A** - remains in cross member.

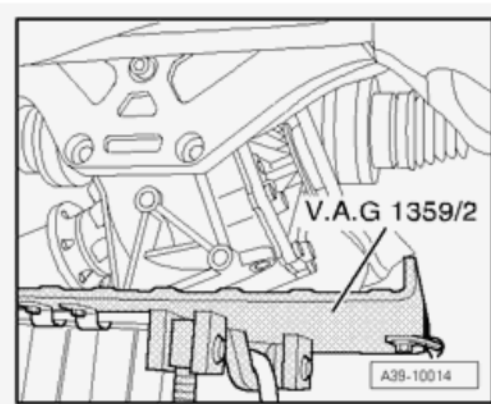


Fig. 73: Lowering/Raising Rear Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lower rear final drive slightly.
- Rotate rear final drive slightly to the side and while doing this pull drive axles out of flange shafts on alternating sides.
- Lower rear final drive completely.

Installing rear final drive - Audi A4 and Cabriolet, Audi A6

Installation is in reverse order of removal. Note the following:

- Rotate rear final drive to side.

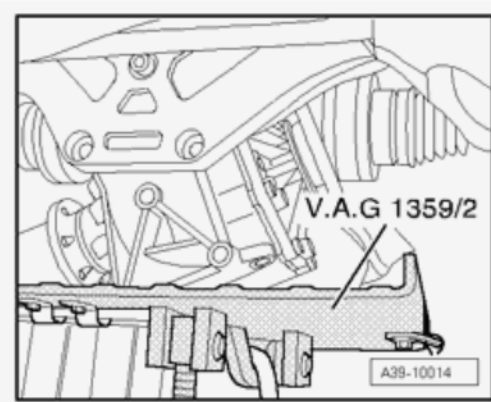


Fig. 74: Lowering/Raising Rear Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Raise rear final drive and while doing this guide in drive axles on alternating sides.

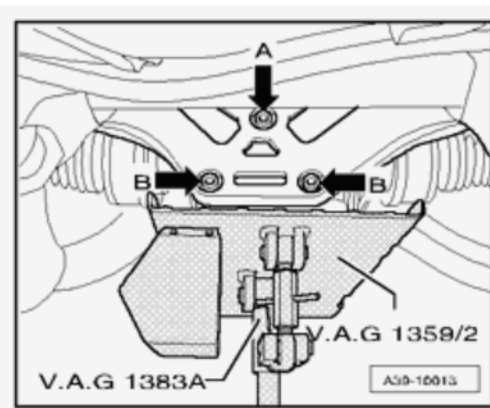


Fig. 75: Removing/Installing Mounting Bolts From Cross Member
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- First install mounting bolt - **arrow A** - by hand.
- Install mounting bolts - **arrows B** -.
- Tighten mounting bolts - **arrow A** - and - **arrows B** -.

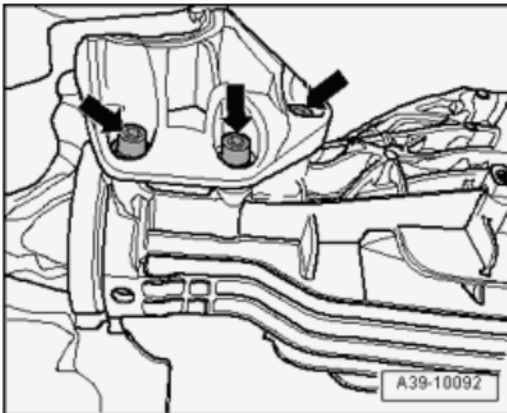


Fig. 76: Removing/Installing Securing Bolts From Transmission Support
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten securing bolts of transmission support - **arrows** -.

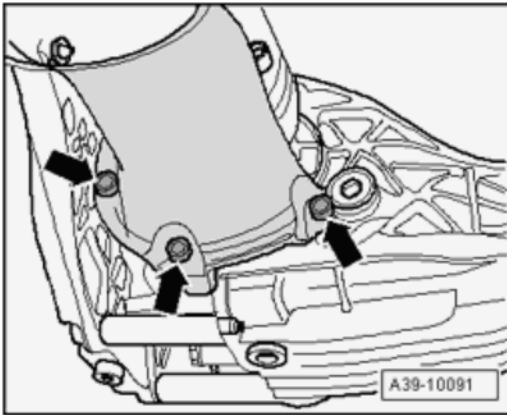


Fig. 77: Removing/Installing Right/Left Shielding Plates From Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install drive axles --> **42 - REAR SUSPENSION** .
- Install right and left shielding plates on rear final drive - **arrows** - .
- Replace seal on flange/driveshaft and tighten bolts of driveshaft to rear final drive, while doing this set markings to face each other.
- Check axle oil level in rear final drive --> **Axle oil in rear final drive, checking**.
- Install rear part of exhaust system -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

Rear final drive (Audi A8), overview

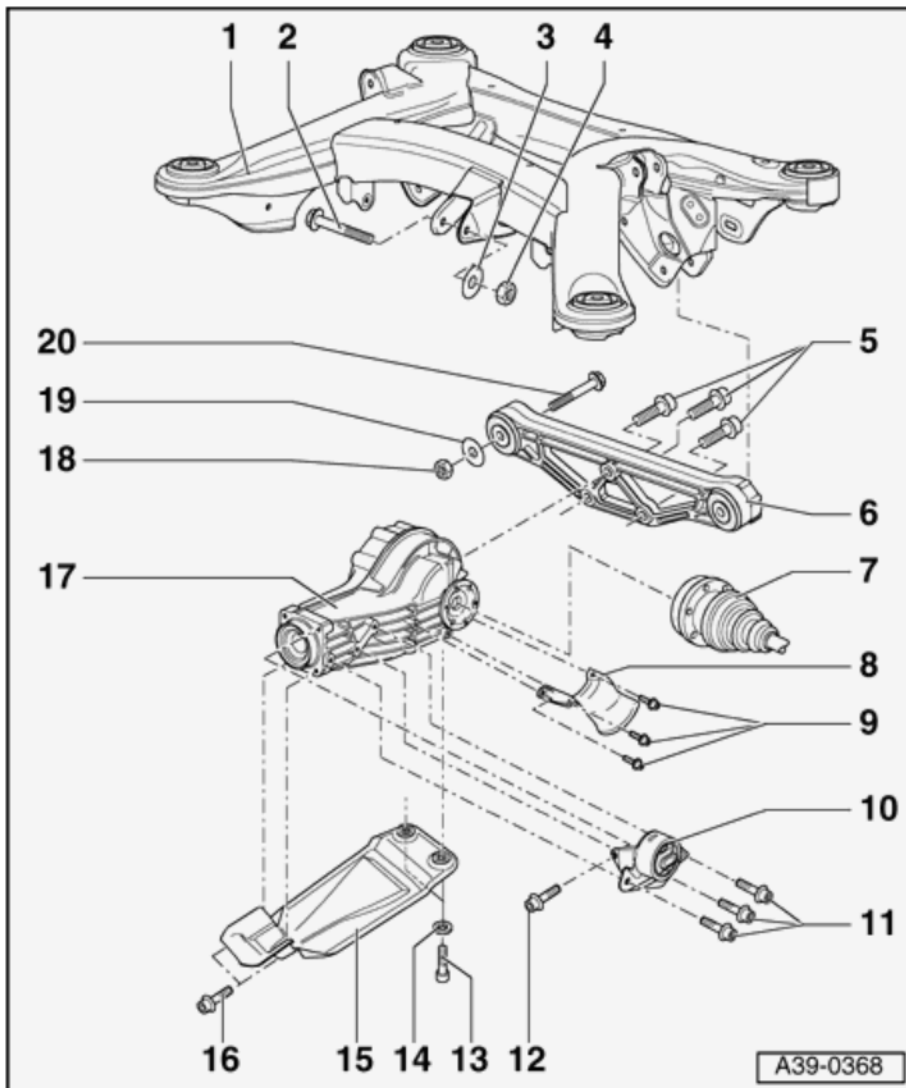


Fig. 78: Rear Final Drive (Audi A8), Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Subframe

- Removing and installing --> **42 - REAR SUSPENSION**

2 - Hex bolt

3 - Washer

4 - Nut, 40 Nm

- Self-locking
- Replace

5 - Hex socket head bolt, 55 Nm

6 - Rear tunnel brace

7 - Drive axle

- Removing and installing --> **42 - REAR SUSPENSION**

8 - Heat shield

9 - Bolt and washer assembly, 25 Nm

10 - Transmission support

- Observe assembly sequence

11 - Hex socket head bolts, 40 Nm plus an additional 90° ($\frac{1}{4}$ turn).

- Replace

12 - Hex socket head bolts, 40 Nm plus an additional 90° ($\frac{1}{4}$ turn).

- Replace

13 - Not installed

14 - Not installed

15 - Not installed

16 - Not installed

17 - Rear final drive

- Removing and installing --> **Rear final drive (Audi A8), removing and installing**

18 - Nut

- Self-locking
- Replace
- Tightening torque --> **42 - REAR SUSPENSION**

19 - Washer

20 - Hex bolt

Rear final drive (Audi A8), removing and installing

Special tools, testers and auxiliary items required

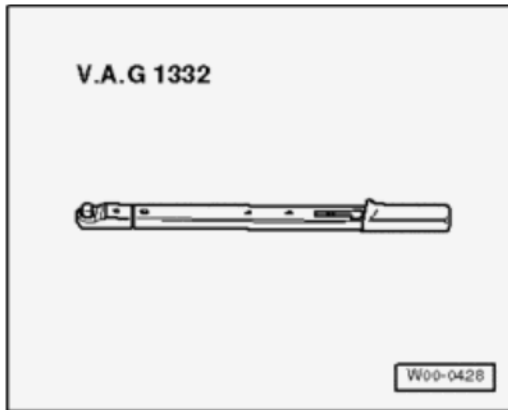


Fig. 79: Identifying Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Torque wrench V.A.G 1332

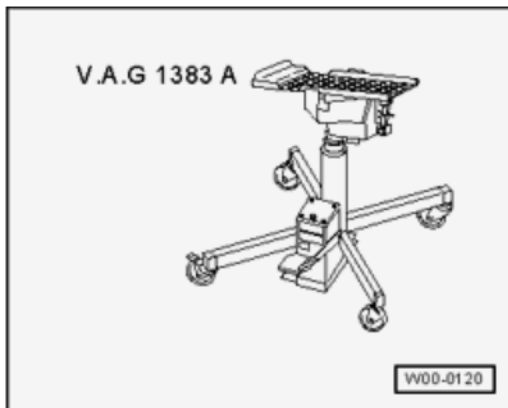


Fig. 80: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack V.A.G 1383 A with universal mount V.A.G 1359/2

Removing

Observe general repair notes --> **General Repair Notes.**

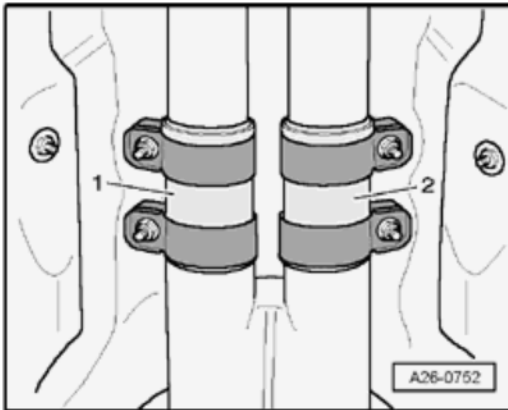


Fig. 81: Disconnecting Exhaust System At Clamping Sleeves
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear part of exhaust system from clamping sleeves - 1 - and - 2 - -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

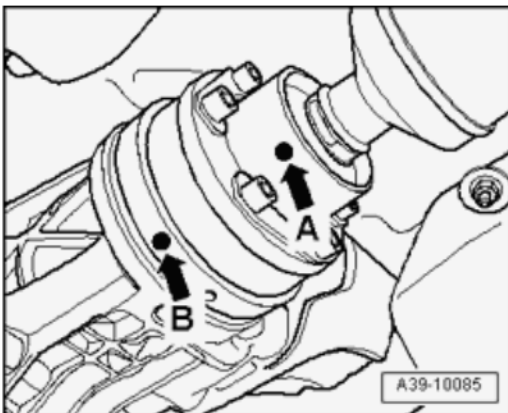


Fig. 82: Identifying Mark Position Of Driveshaft Flange To Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether there is a marking (colored marking) on driveshaft and at flange/driveshaft at rear final

drive - **arrows A and B** -.

- If these markings are not present, mark in color the position of driveshaft flange - **arrow A** - to rear final drive - **arrow B** -.

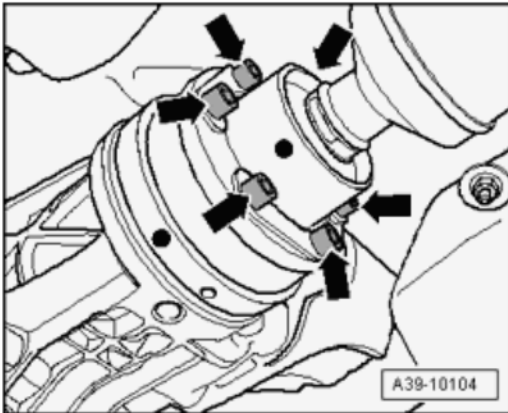


Fig. 83: Removing/Installing Mounting Bolts On Rear CV Joint And Driveshaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove driveshaft from rear final drive - **arrows** -.

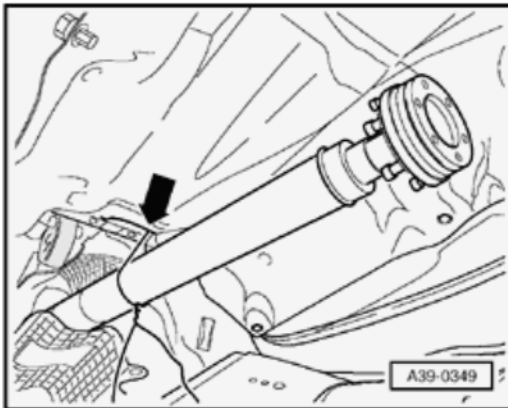


Fig. 84: Disconnecting Driveshaft From Rear Final Drive And Tie Up To Side
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tie up drive shaft to side - **arrow** -.

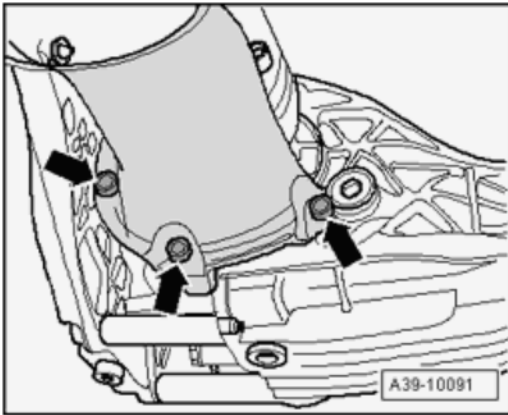


Fig. 85: Removing/Installing Right/Left Shielding Plates From Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shields on rear final drive - **arrows** -.
- Remove left and right drive axles.

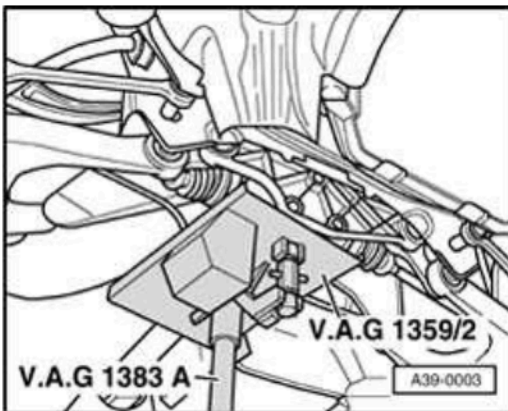


Fig. 86: Place Engine/Transmission Jack V.A.G 1383 A With Universal Transmission Support V.A.G 1359/2 Under Final Drive And Secure Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Set engine/transmission jack V.A.G 1383 A with universal mount V.A.G 1359/2 under rear final drive.

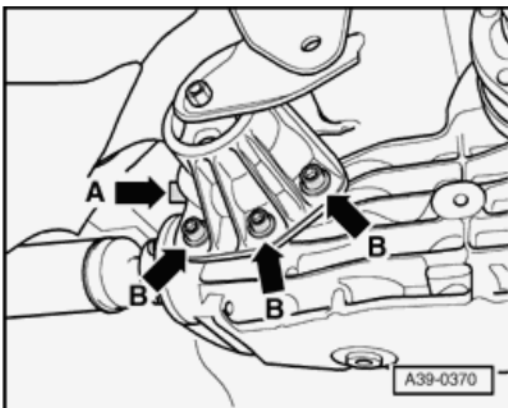


Fig. 87: Removing/Installing Bolts For Transmission Support
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows A and B** - for transmission support.

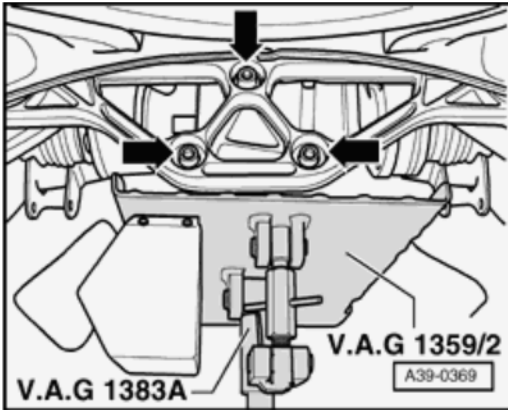


Fig. 88: Removing/Installing Bolts For Rear Cross Member
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** - for rear cross member.

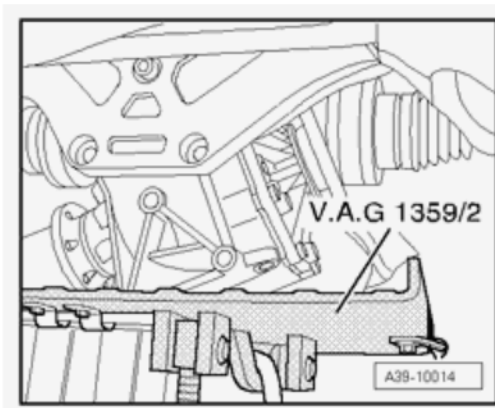


Fig. 89: Lowering/Raising Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lower rear final drive slightly.
- Rotate rear final drive slightly to side and while doing this pull drive axles out of flange shafts on alternating sides.
- Lower rear final drive completely.

Installing rear final drive - Audi A8

Installation is in reverse order of removal. Note the following:

- Rotate final drive to the side.

- Raise rear final drive and while doing this guide in drive axles on alternating sides.

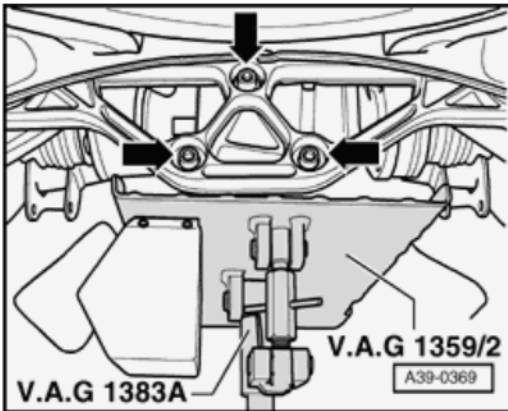


Fig. 90: Removing/Installing Bolts For Rear Cross Member
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts - arrows -.

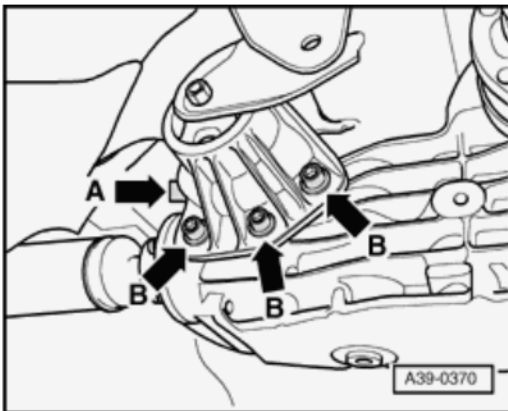


Fig. 91: Removing/Installing Bolts For Transmission Support
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install bolts - A - and - B - by hand (complete transmission support makes contact on final drive). Then, first tighten bolt - A - and then bolts - B -.

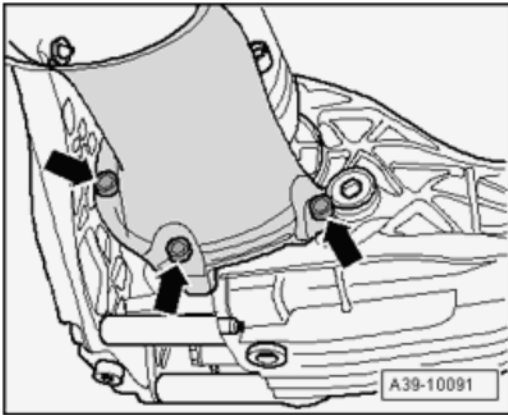


Fig. 92: Removing/Installing Right/Left Shielding Plates From Rear Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install heat shields on rear final drive - **arrows** -.
- Replace seal on flange/driveshaft and tighten bolts of driveshaft to rear final drive, while doing this set markings to face each other.
- Check axle oil level in rear final drive --> **Axle oil in rear final drive, checking.**
- Install and adjust rear part of exhaust system free of stress -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

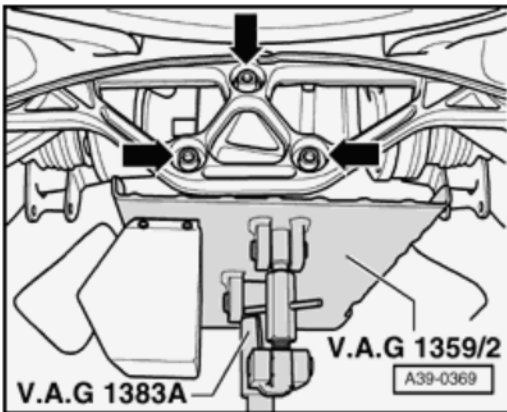


Fig. 93: Removing/Installing Bolts For Rear Cross Member
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Tightening torques

Component	Nm
Rear final drive to rear cross member - arrows -	55

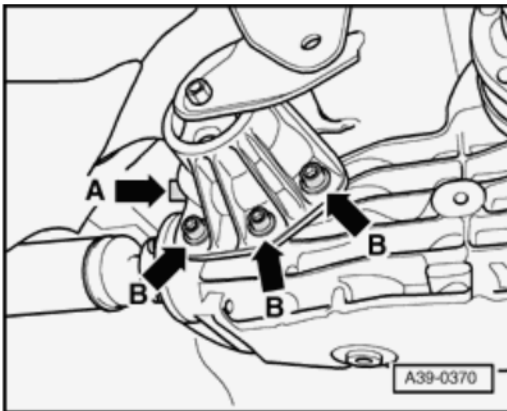


Fig. 94: Removing/Installing Bolts For Transmission Support
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Tightening torques

Rear final drive to transmission support - arrows A and B -	40 + 90° ¹⁾²⁾
Heat shields to rear final drive	25
• ¹⁾ Replace bolts. • ¹⁾ 90° corresponds to one quarter turn.	

OIL SEALS FOR FLANGE SHAFTS, REPLACING

Oil seals for flange shafts, replacing

1:13:07 AM	Page 59	

- Oil seals can only be replaced when transmission is removed.

Special tools, testers and auxiliary items required

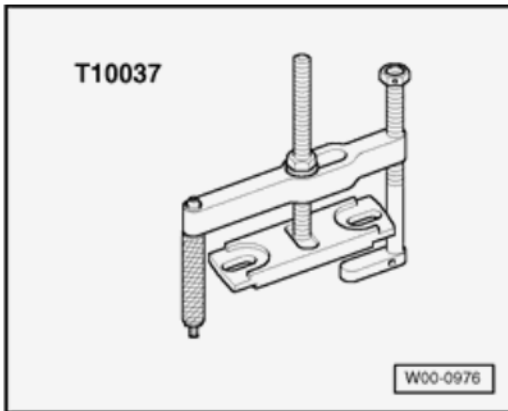


Fig. 95: Puller T10037

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Puller T10037

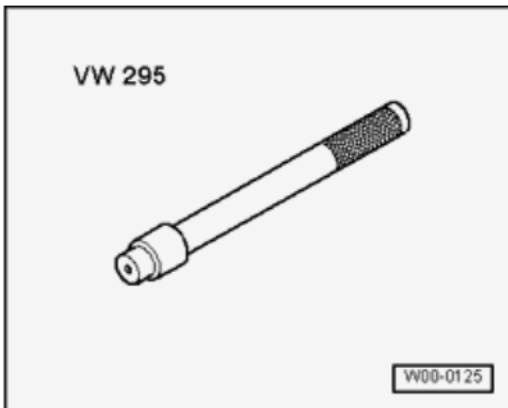


Fig. 96: Drift VW 295

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drift VW 295
- Driver T40108
- *Sealing grease G 052 128 A1*

Removing

- Observe general repair notes --> **General Repair Notes**.
- Remove rear final drive --> **Rear final drive (Audi A4 and Cabriolet, Audi A6), removing and installing.**

Remove right drive flange

- Place drip tray underneath.

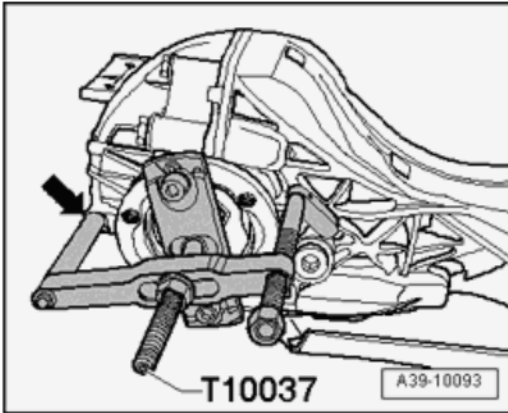


Fig. 97: Threading Puller T10037 Tightly To Housing And Pulling Out Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thread puller T10037 tightly to housing - **arrow** - and pull out flange shaft.

Remove left drive flange

- Place drip tray underneath.

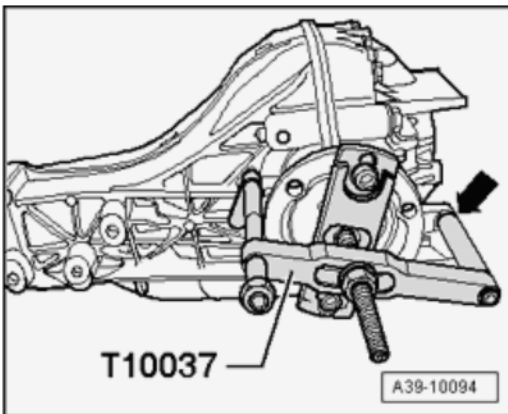


Fig. 98: Threading Puller T10037 Tightly To Housing And Pulling Out Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thread puller T10037 tightly to housing - **arrow** - and pull out flange shaft.

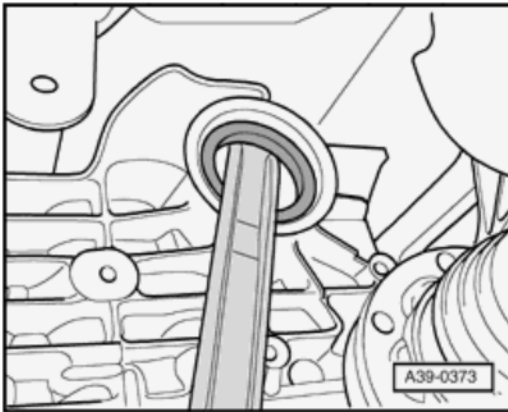


Fig. 99: Prying Out Sealing Ring With Suitable Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry out sealing ring with suitable lever.

Installing

Installation is in reverse order of removal. Note the following:

Installing right oil seal

- Coat outer edge of gasket with axle oil.
- Fill area between sealing lip and dust lip halfway with *sealing grease G 052 128 A1*.

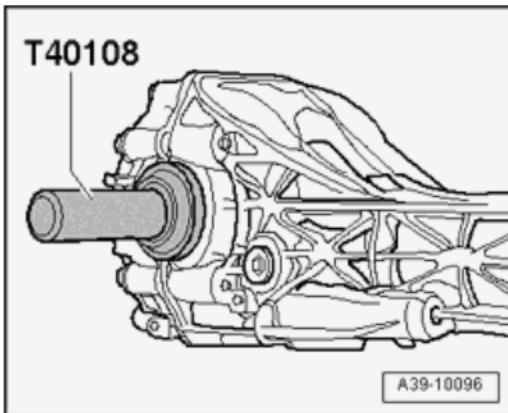


Fig. 100: Driving In New Seal To Stop, Without Canting Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new seal to stop, without canting seal.

Installing left oil seal

- Coat outer edge of gasket with axle oil.
- Fill area between sealing lip and dust lip halfway with *sealing grease G 052 128 A1*.

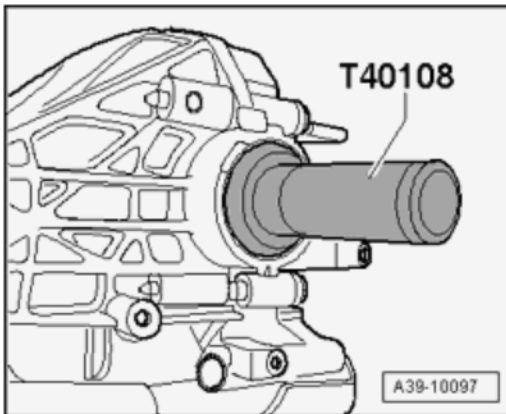


Fig. 101: Driving In New Seal To Stop, Without Canting Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new seal to stop, without canting seal.

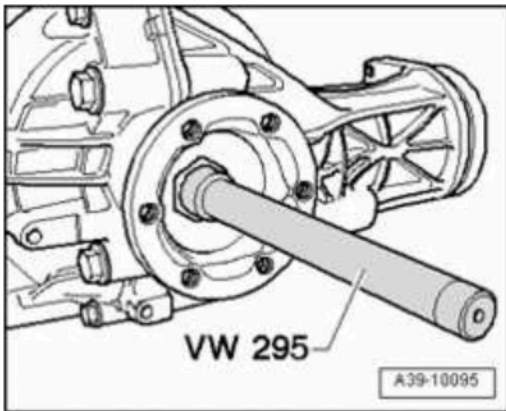


Fig. 102: Installing Right/Left Flange Shafts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Install right and left flange shafts

- Drive in flange shaft using centering mandrel VW 295.
- Install rear final drive.
- Axle oil in rear final drive, checking --> **Axle oil in rear final drive, checking.**

SEALING RING FOR FLANGE/DRIVESHAFT (REAR FINAL DRIVE INSTALLED), REPLACING

Sealing ring for flange/driveshaft (rear final drive installed), replacing

Special tools, testers and auxiliary items required

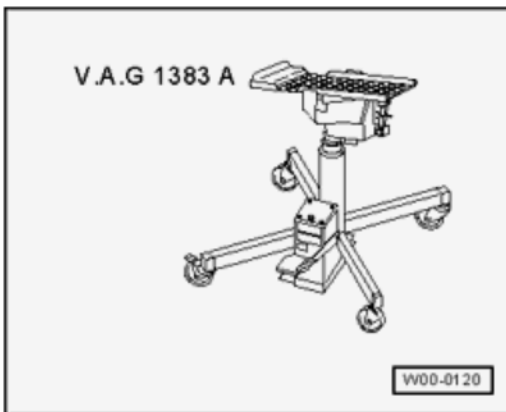


Fig. 103: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack V.A.G 1383 A with universal transmission support V.A.G 1359/2

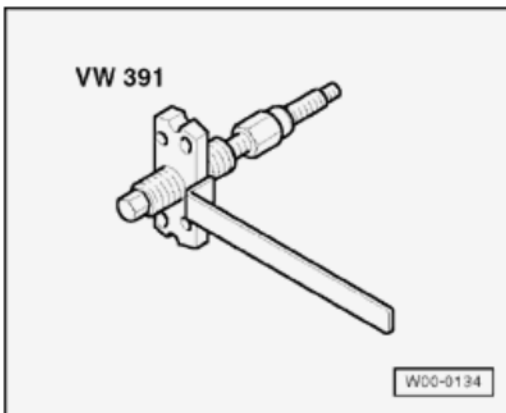


Fig. 104: Puller VW 391
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Puller VW 391

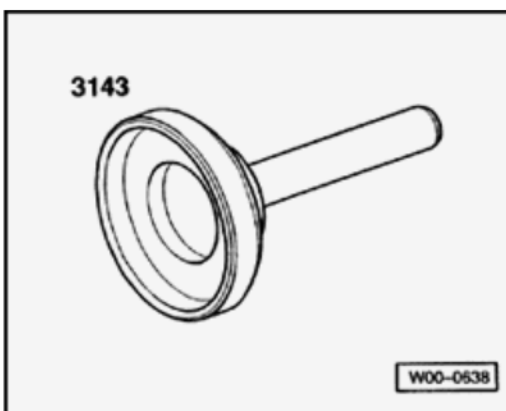


Fig. 105: Seal Driver-Frt Wheel Bearing 3143
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Seal driver-frt wheel bearing 3143

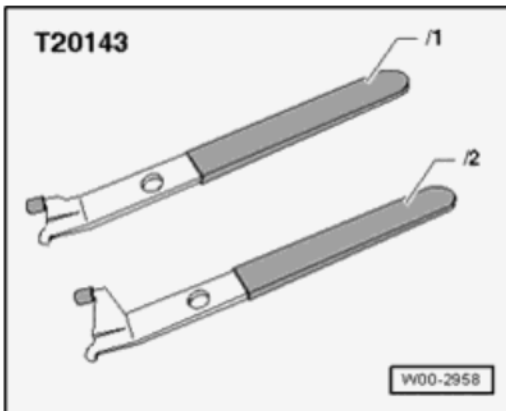


Fig. 106: Identifying Extractor Hook T20143

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pulling hook T20143
- Driver T40109
- *Sealing grease G 052 128 A1*
- *2 hex bolts M 8 x 30*

Removing

- Rear final drive installed

Observe general repair notes --> **General Repair Notes.**

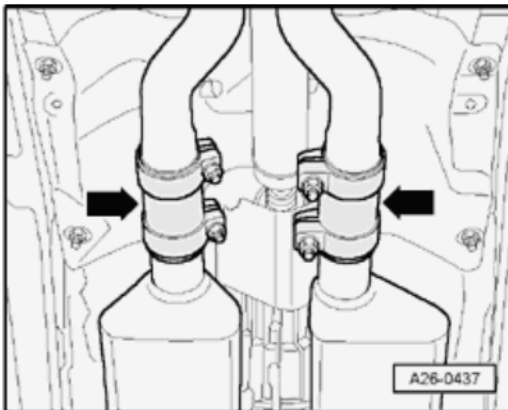


Fig. 107: Loosening Clamping Sleeves

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rear part of exhaust system from clamping sleeves - **arrows** - -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Disconnect driveshaft from rear final drive and tie up --> **Driveshaft, disconnecting from rear final drive.**

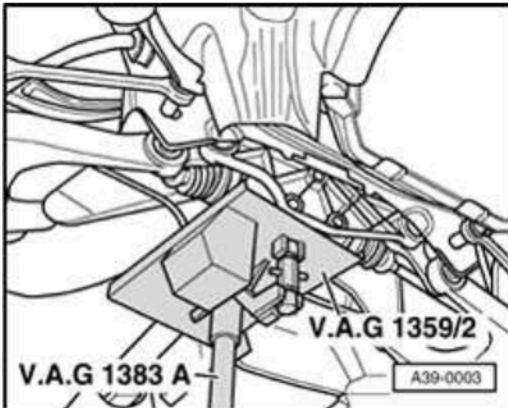


Fig. 108: Place Engine/Transmission Jack V.A.G 1383 A With Universal Transmission Support V.A.G 1359/2 Under Final Drive And Secure Final Drive
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place Engine/transmission jack V.A.G 1383 A with universal transmission support V.A.G 1359/2 under rear final drive.

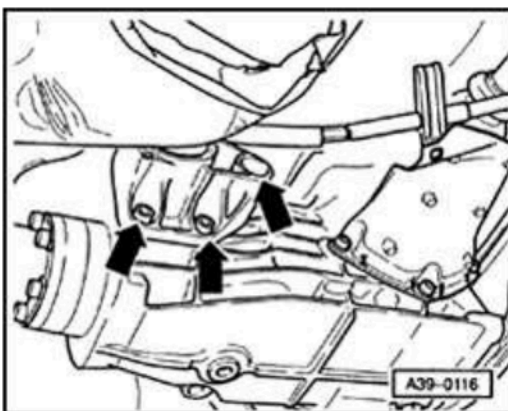


Fig. 109: Removing/Installing Securing Bolts At Transmission Support

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts from transmission support - **arrows** -.
- Lower final drive carefully until flange/driveshaft is accessible.

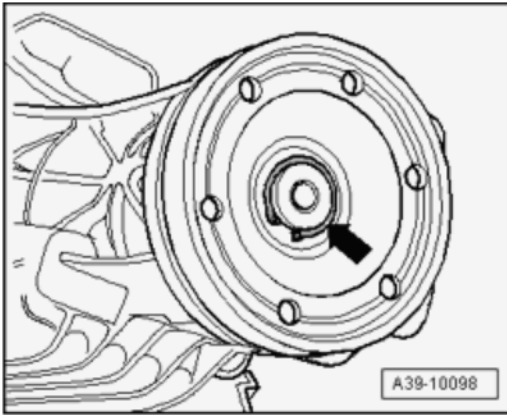


Fig. 110: Removing/Installing Circlip

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **arrow** -.

CAUTION: If circlip is over-stretched or damaged, it must be replaced by a new circlip of the same thickness.

- Install 2 *hex bolts M 8 x 30* - **arrow** - in flange.
- Place drip tray underneath.

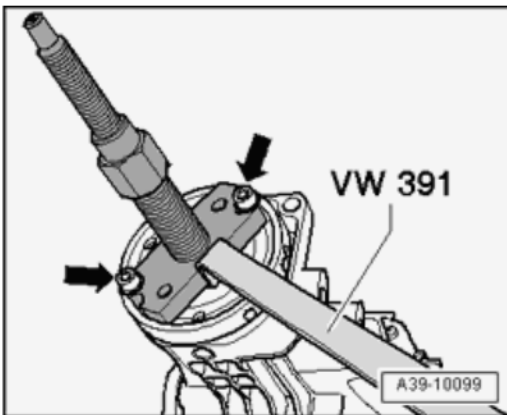


Fig. 111: Pulling Off Drive Shaft Flange Using Puller VW 391

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull off drive shaft flange using puller VW 391.

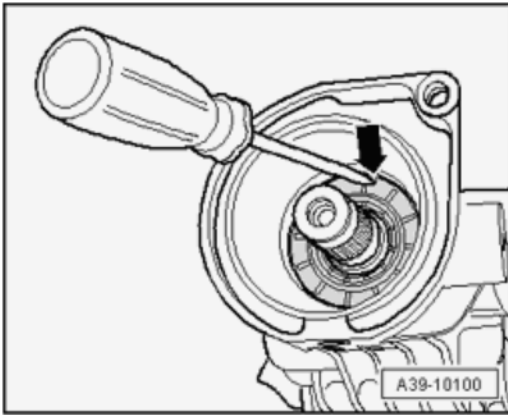


Fig. 112: Pushing Oil Seal On Top, Outer Circumference Slightly Inward
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully push oil seal on top, outer circumference - **arrow** - slightly inward.

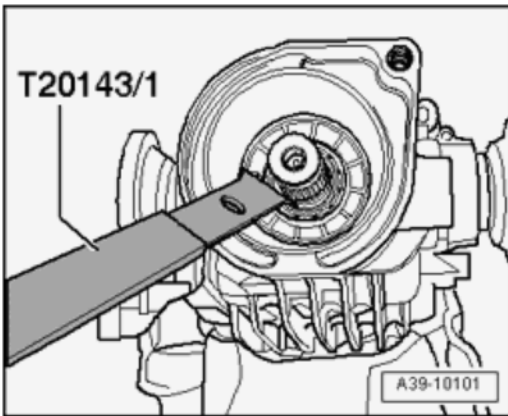


Fig. 113: Prying Out Obliquely Set Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Then pry out obliquely set oil seal.

CAUTION: Make sure that contact surface for shaft oil seal is not damaged on the drive pinion.

Installing

Installation is in reverse order of removal. Note the following:

- Coat outer edge of gasket with axle oil.
- Fill area between sealing lip and dust lip halfway with *sealing grease G 052 128 A1* .

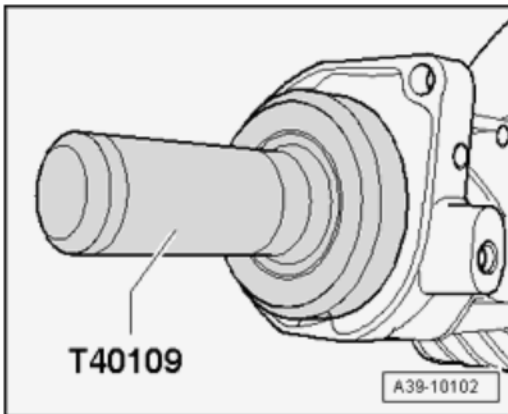


Fig. 114: Driving In New Seal To Stop, Without Canting Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new seal to stop, without canting seal.
- Heat flange/driveshaft to a maximum of 80°.

CAUTION: Wear protective gloves

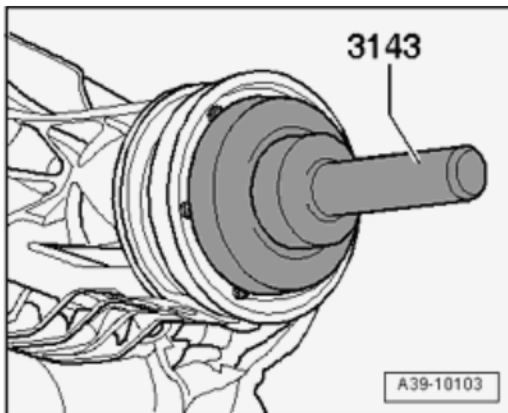


Fig. 115: Driving On Flange/Driveshaft Far Enough Until Circlip Can Be Installed
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive on flange/driveshaft far enough until circlip can be installed.

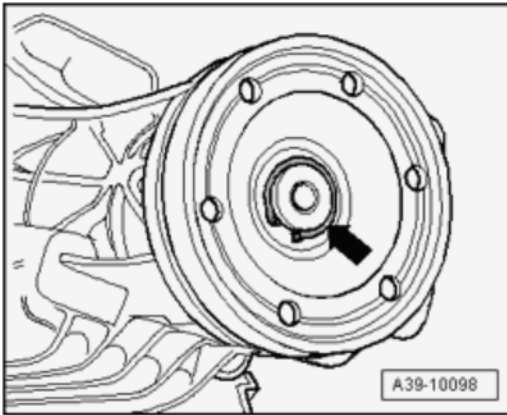


Fig. 116: Removing/Installing Circlip

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install circlip - arrow -.

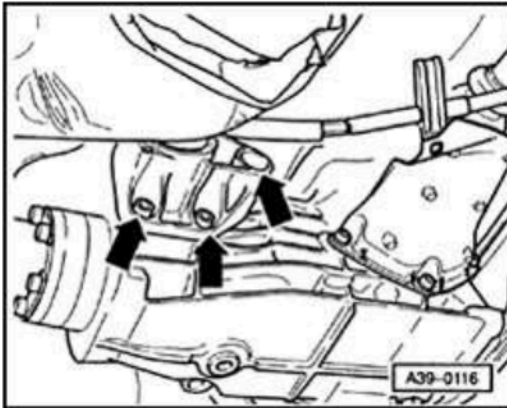


Fig. 117: Removing/Installing Securing Bolts At Transmission Support

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten securing bolts of transmission support - **arrows** -.
- Then install driveshaft to rear final drive.
- Axle oil in rear final drive, checking --> **Axle oil in rear final drive, checking.**
- Install rear part of exhaust system -->
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
 - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
 - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE
MECHANICAL, ENGINE CODE(S): BHF

39 FINAL DRIVE, DIFFERENTIAL

DRIVE SHAFT, SERVICING

Drive shaft, servicing

NOTE:

- General repair instructions. Refer to Repair instructions.
- Drive shaft may be bent without force up to stop of the central constant velocity joint. Further bending may cause damage to the joint or to the boots.
- Only store and transport drive shaft extended.
- No repair work can be carried out on the drive shaft with the exception of removing, installing and adjusting.
- If the drive shaft is only detached at the transmission or from rear final drive then the drive shaft is to be tied-up at the constant velocity joint. The drive shaft may also be bent without force up to the stop of the central constant velocity joint, if necessary.
- Prior to removal mark the position of all parts in relation to each other. Reinstall in the same positions otherwise the imbalance will be excessive; the bearings could be damaged and humming noises may occur.
- After removing the drive shaft from the rear final drive, a thick washer that may be located between the shim and the hexagon socket head bolt must not be reinstalled.
- If complaints are received (noises, vibrations), it is essential to check the radial run-out to drive flange at the rear final drive. A correct adjustment may repair the problem. Refer to Drive shaft flange, measuring and marking radial run-out.

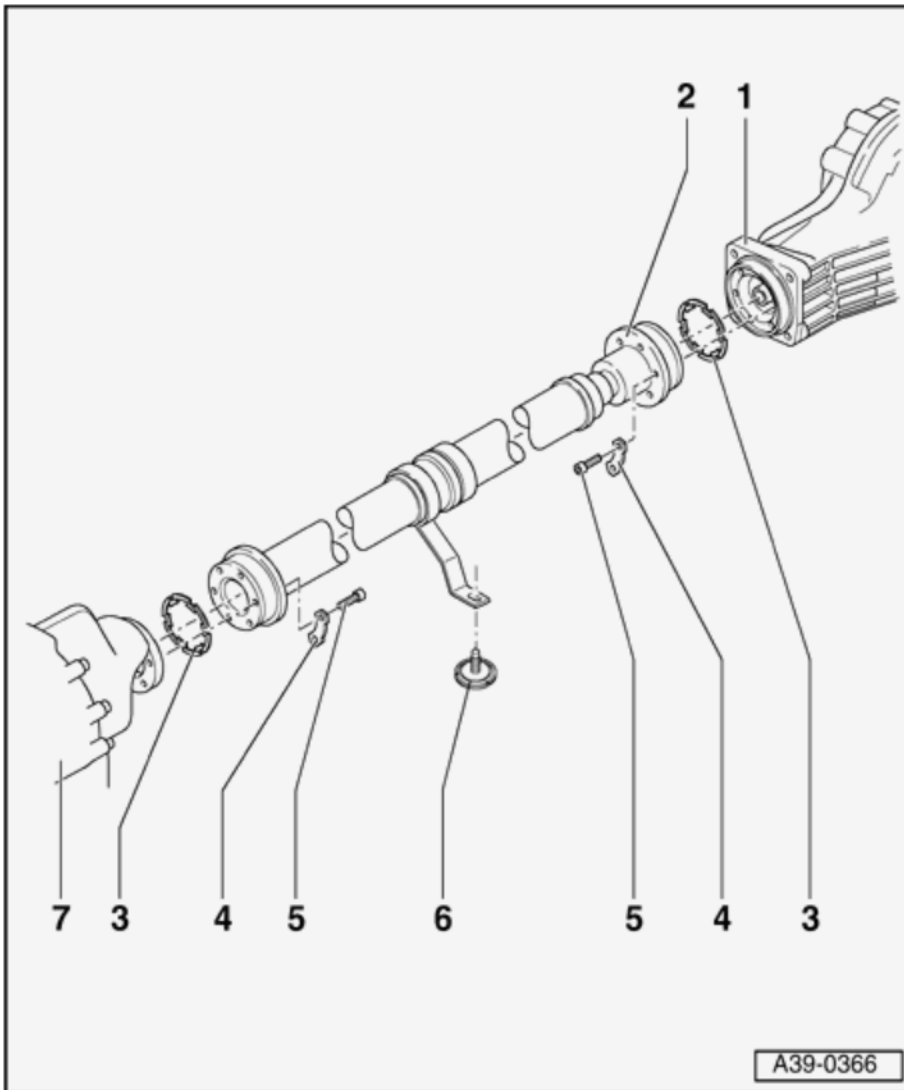


Fig. 8: Exploded View Of Drive Shaft

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Rear final drive

2 - Drive shaft

- Removing and installing. Refer to **Drive shaft, removing and installing.**

3 - Gasket

- Replace
- Detach protective foil and stick self-adhesive side of the gasket onto flange shaft
- Degrease flange shaft

4 - Shim

5 - Hex socket-head bolt - 55 Nm

- Self-locking
- Replace
- The tapped holes for the bolts in the flange shaft must always be cleaned (e.g. with a thread tap)

6 - Combi bolt - 23 Nm**7 - Transmission**

Drive shaft, removing and installing

Special tools, testers and auxiliary equipment required

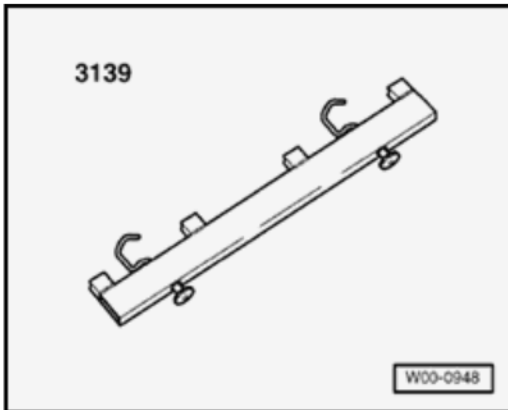


Fig. 9: Alignment Fixture-4W Dr. Shaft 3139
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Assembly tool 3139

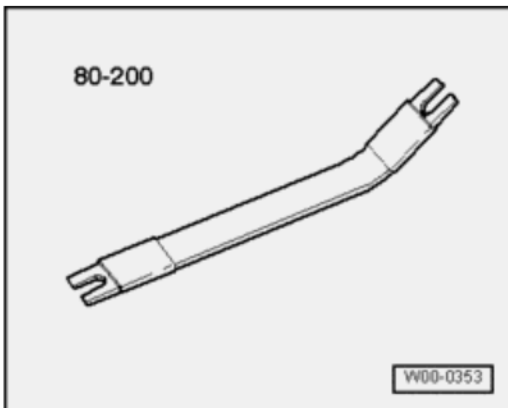


Fig. 10: Identifying Pry Lever 80-200
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pressing lever 80-200

- Bolt M8 x 30 (2x)

Special tools, testers and auxiliary items required

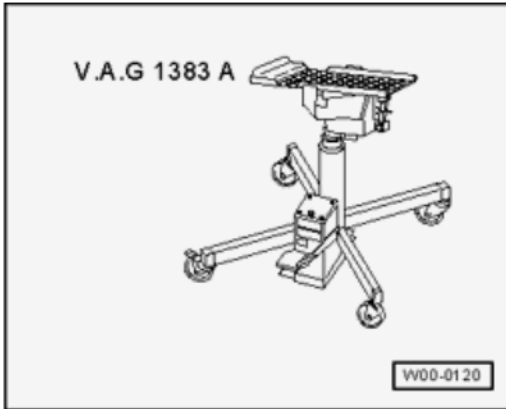


Fig. 11: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack V.A.G 1383 A with universal transmission mounting V.A.G 1359/2

Removing

- See notes. Refer to **Drive shaft, servicing**
- Remove rear section of exhaust system as from clamp(s):

Refer to

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

; Removing and installing exhaust-system components

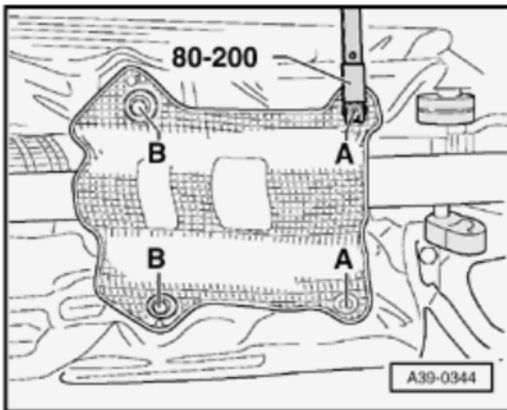


Fig. 12: Using Press Lever - RMV Outside Mirror 80-200 To Pry Off Rear Attachments Of Heat Shield For Drive Shaft & Removing Securing Bolts For Center Bearing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use press lever - RMV outside mirror 80-200 to pry off rear attachments -A- of heat shield for drive shaft.
- Remove securing bolts -B- for center bearing.

NOTE: When removing the securing bolts support the drive shaft by hand. Do not bend drive shaft. Refer to Drive shaft, servicing.

- Remove heat shield. Continue supporting drive shaft.
- Screw in securing bolts for center bearing again hand-tight.

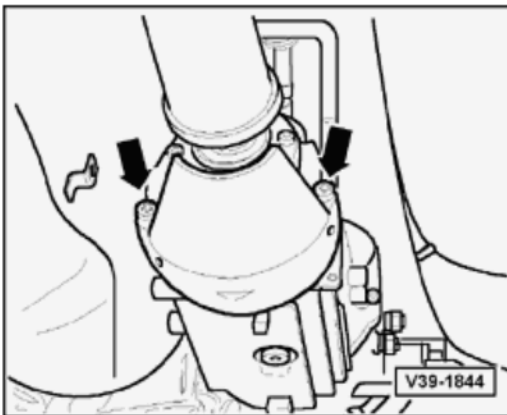


Fig. 13: Identifying Driveshaft Shield

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for drive shaft off transmission -arrows-.

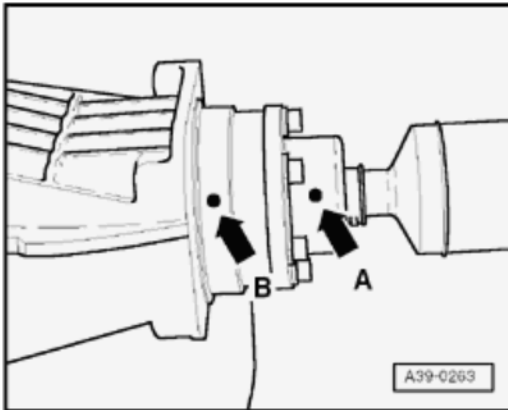


Fig. 14: Driveshaft, Removing And Installing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check for a factory marking (colored dot) on drive shaft and on drive shaft flange on final drive at the rear. If no colored dot is present, mark the position of the drive shaft flange -arrow A- relative to the rear final drive -arrow B- with a colored dot.

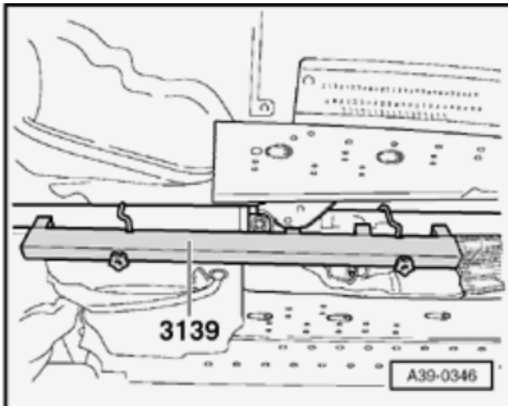


Fig. 15: Engaging Alignment Fixture-4W dr. Shaft 3139

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engage alignment fixture-4W dr. shaft 3139 and tighten plastic nuts.

NOTE: Never install assembly appliance onto balance plates.

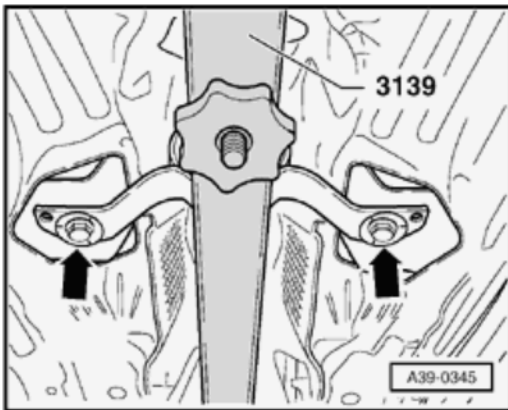


Fig. 16: Removing/Installing Securing Bolts For Center Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts -arrows- for the center bearing.

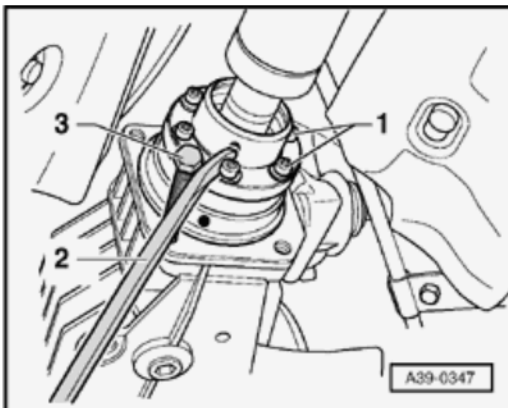


Fig. 17: Loosening Front And Rear Driveshaft Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw in bolt -3- M10 x 100 into rear final drive.
- To loosen bolts -1- of the rear and front drive shaft, counterhold with an assembly lever -2-.
- Remove securing bolts at the front constant velocity joint, detach the drive shaft and support it using engine/transmission jack V.A.G 1383 A.
- Remove securing bolts at rear constant velocity joint and detach drive shaft.

NOTE: Only transport and store drive shaft when extended.

Installing

Installation is carried out in reverse order. Note the following:

NOTE:

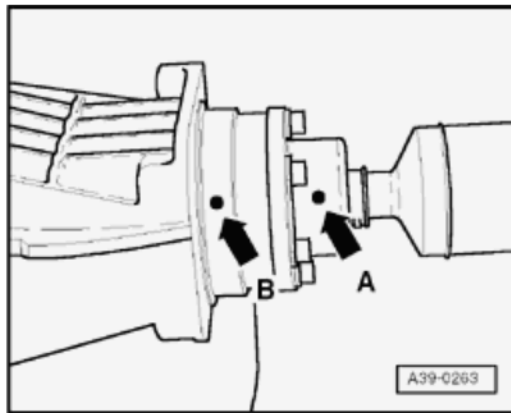


Fig. 18: Driveshaft, Removing And Installing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- To avoid imbalance, the flanges of the drive shaft -arrow A- and of the rear final drive -arrow B- must be installed so that the factory color markings or the markings made subsequently are in line.
- If a new drive shaft is installed and if the factory color marking on the flange of the rear final drive is no longer visible, the radial run-out on the drive shaft flange must be measured. Refer to Drive shaft flange, measuring and marking radial run-out and the color marking on the drive shaft placed in line with the new marking on the flange.
- Replace gaskets on flange shafts (detach protective foil and stick gasket onto flange shaft).
- Remove the old and dry high-temperature grease from the constant velocity joints and the flanges for the drive shaft. Replace with the exact same quantity of new high-temperature grease G 000 633.
- Note the installation position of the drive shaft: The central constant velocity joint is located behind the center bearing facing toward the rear final drive.
- After removing the drive shaft from the rear final drive, a thick washer that may be located between the shim and the bolt head must not be reinstalled.
- It is essential that the locking fluid remaining in the threads in the flange shafts on the transmission and rear final drive is cleaned out after removing the drive shaft. Otherwise there is a danger that the new bolts will seize when they are screwed in and then shear if they have to be removed later.
- The threaded holes can be cleaned with a thread tap.
- Replace drive shaft bolts (self-locking).

- Install drive shaft and attach bolts for constant velocity joint.

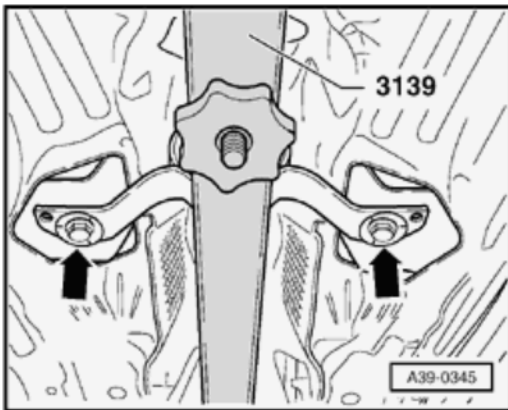


Fig. 19: Removing/Installing Securing Bolts For Center Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw in securing bolts -arrows- for center bearing hand-tight.

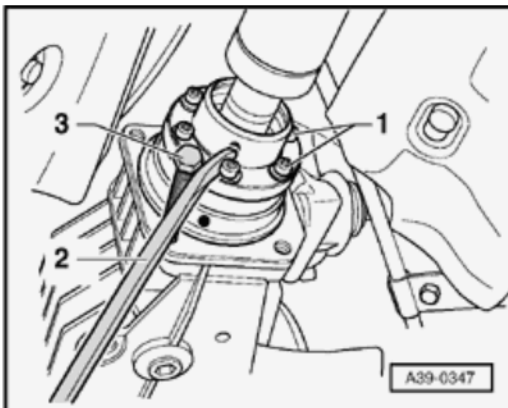


Fig. 20: Loosening Front And Rear Driveshaft Bolts
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw in bolt -3- M10 x 100 into rear final drive.
- To tighten bolts -1- of the rear and front drive shaft, counterhold with an assembly lever -2-.

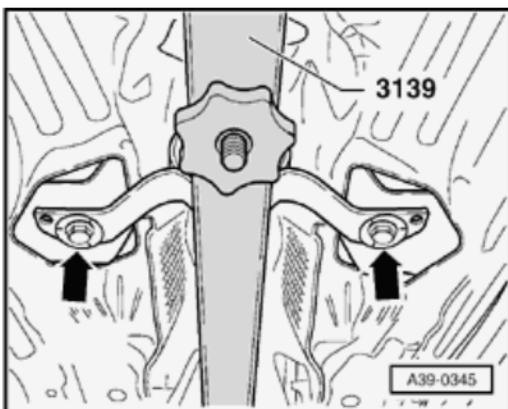


Fig. 21: Removing/Installing Securing Bolts For Center Bearing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove assembly device 3139
- Remove securing bolts -arrows- for the center bearing. The drive shaft must be supported manually by a second mechanic.

NOTE: When removing the securing bolts support the drive shaft by hand. Refer to Drive shaft, servicing.

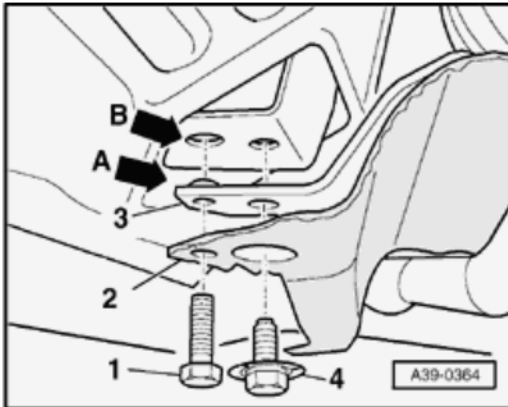


Fig. 22: Installing Heat Shield, Screwing In Securing Bolts For Left/Right Center Bearing & Heat Shield On Right/Left At Center Bearing Using Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install heat shield -2-. Continue supporting drive shaft.
- Screw in securing bolts -4- for left and right center bearing several turns.
- Secure heat shield -2- on right and left at the center bearing -3- using bolts -1- (M8x30).

NOTE: When tightening the combination bolt -4- make sure that the center plug -arrow A- is located at the securing bore -arrow B-.

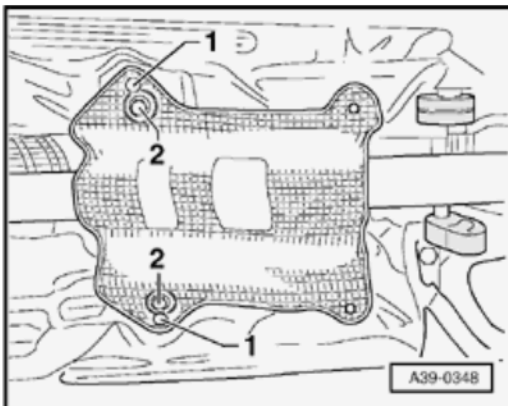


Fig. 23: Installing Rear Securing Clips For Heat Shield
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten securing bolts -2- for the center bearing.
- Install rear securing clips for the heat shield.
- Remove bolts -1-
- Install exhaust system and align stress-free:

Refer to

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

; Removing and installing exhaust-system components

Tightening torques

Component	Nm
Intermediate bearing on body	23
Drive shaft to transmission	55
Drive shaft to rear final drive	55
Heat shield for drive shaft to transmission	25

Drive shaft flange, measuring and marking radial run-out

Special tools, testers and auxiliary equipment required

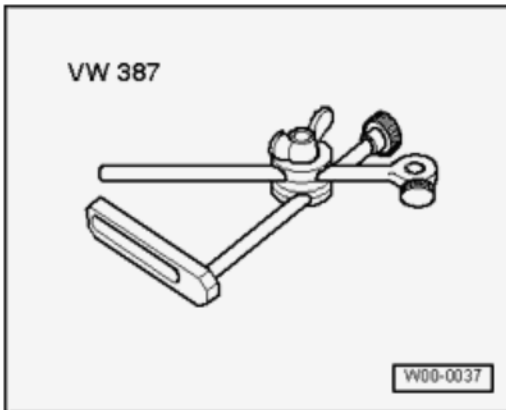


Fig. 24: Identifying Dial Gauge Holder VW 387

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Universal dial indicator bracket VW 387
- Dial indicator
- Bolt M10 x 85

NOTE:

- The radial run-out must always be measured when the drive shaft flange on the rear final drive has been removed. Affix a new colored dot and remove the old color marking.
- If a new drive shaft is installed and if the marking on the flange shaft of the rear final drive is no longer visible, the position of maximum radial run-out must be determined and marked by a colored dot.
- The colored dot on the drive shaft is positioned opposite the above colored dot. Refer to Installing.
- The radial run-out can be measured when rear final drive is installed but the drive shaft must be disconnected at rear final drive. See notes. Refer to Drive shaft, servicing

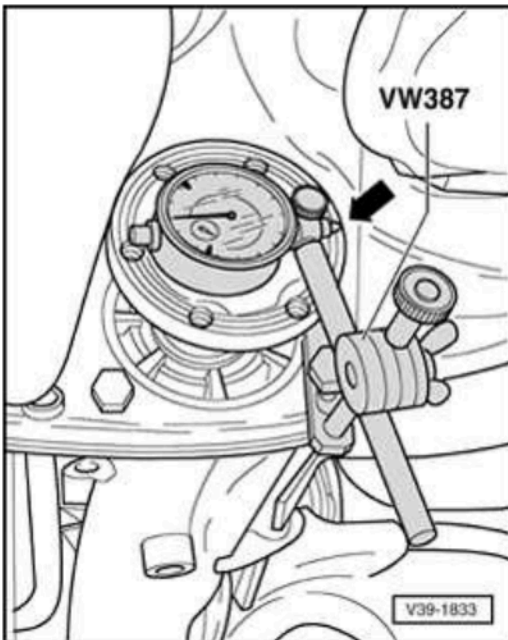


Fig. 25: Install Measuring Tools (Vehicles With Threaded Hole In Facing Side Of Rear Final Drive)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure universal dial indicator holder VW 387 with dial indicator at rear final drive.
- Position dial indicator on ground diameter in drive shaft flange -arrow- and set to "0" with 1 mm preload.
- Rotate differential by turning the two rear wheels (left and right-hand flange shafts) simultaneously in one direction until the drive shaft flange has undergone one complete revolution.
- Mark the position of greatest radial run-out on flange exterior by a colored dot (equates to greatest distance from rotational axis).
- Remove old marking from drive shaft flange.
- Install drive shaft. Refer to **Drive shaft, removing and installing**.

GEAR OIL LEVEL IN REAR FINAL DRIVE, CHECKING

Gear oil level in rear final drive, checking

Special tools, testers and auxiliary equipment required

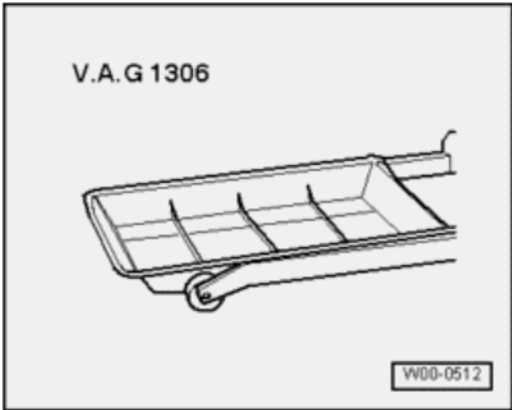


Fig. 26: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray V.A.G 1306
 - Place drip tray V.A.G 1306 underneath.

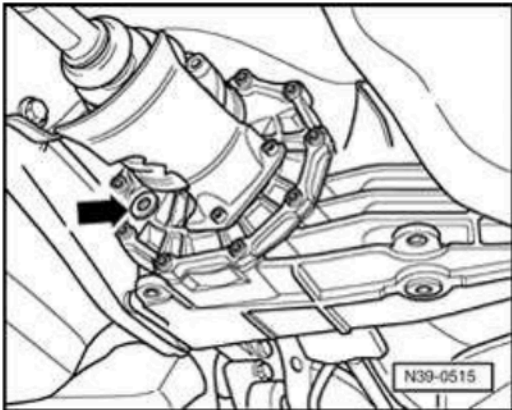


Fig. 27: Identifying Sealing Plug For Gear Oil Inspection Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw plug -1- to gear oil control.

The oil level is correct when rear final drive is filled to lower edge of filler hole.

- Top off with gear oil, if necessary:

Specification. Refer to **Allocation of mechanical units: 5-speed Manual Transmission 01A AWD.**

- Install screw plug.

Tightening torque

Component	Nm
1:10:51 AM	Page 14

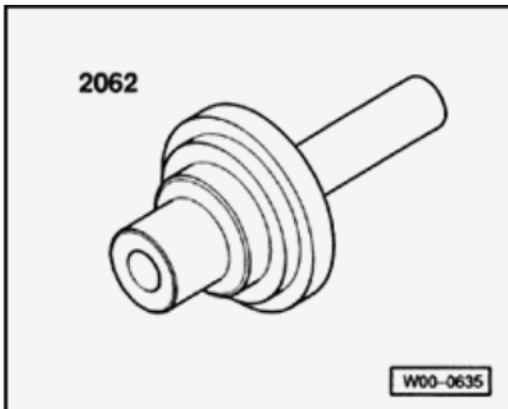
Screw plug

35

FLANGE SHAFT OIL SEALS, REPLACING

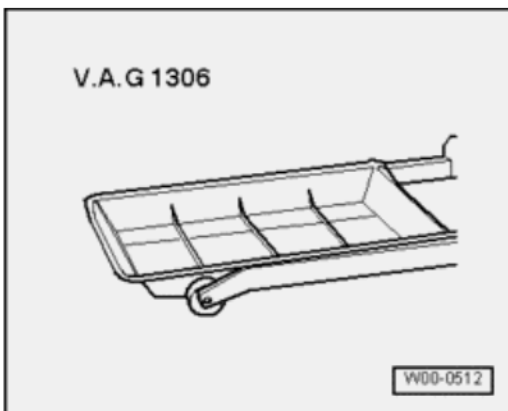
Flange shaft oil seals, replacing

Special tools, testers and auxiliary equipment required

**Fig. 28: Fitting Drift 2062**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Driver 2062

**Fig. 29: Identifying Drip Tray V.A.G 1306**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray V.A.G 1306
- Observe general repair instructions. Refer to **Repair instructions**
- Rear final drive installed

NOTE: The illustration shows the left-hand side of the rear final drive. The procedure

for removing and installing the joint flange and sealing ring on the right-hand side is identical.

Removing

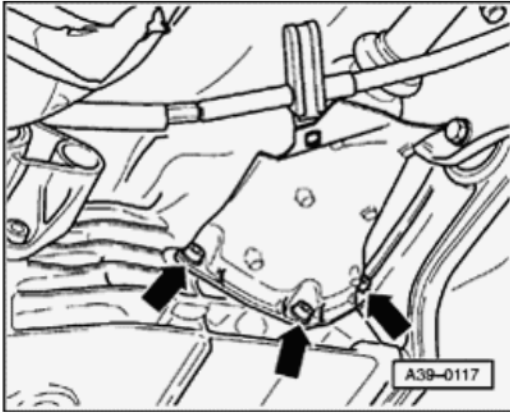


Fig. 30: Removing/Installing Heat Shields From Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shields from final drive -arrows-.
- Disconnect drive axle.

Refer to **42 - REAR SUSPENSION** ; Removing and installing drive axle

- Place drip tray underneath to collect oil.

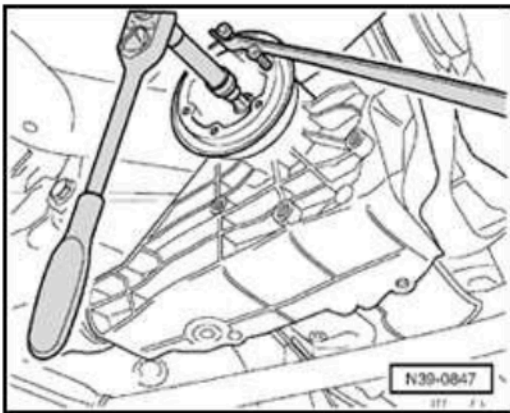


Fig. 31: Removing/Installing Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolt for flange shaft, then screw two bolts into the flange and counterhold the flange shaft using the assembly lever.
- Pull out flange shaft.

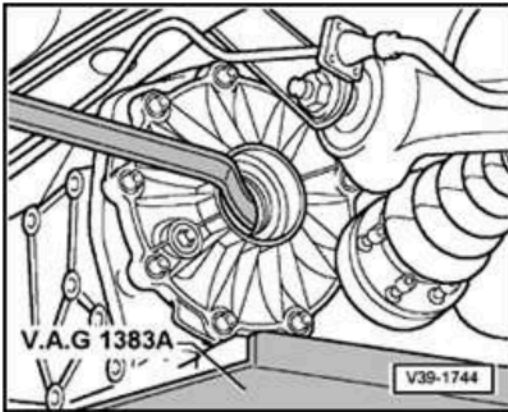


Fig. 32: Removing Flange Shaft Oil Seals

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry out flange shaft oil seals using a suitable lever.

Installing

Installation is carried out in reverse order. Note the following:

- Pack space between sealing and dust lips half-full with sealing grease G 052 128 A1.
- Lightly oil outer circumference of seal.

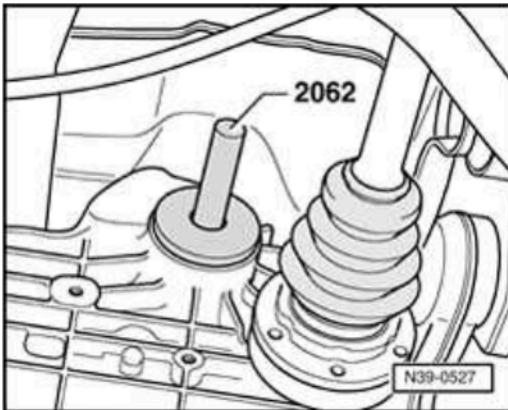


Fig. 33: Driving In New Flange Seal

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive new seal in onto stop, for this purpose do not cant seal.
- Insert flange shaft.
- Fasten flange shaft with cone head bolt.
- Top off gear oil in rear final drive and check oil level. Refer to **Gear oil level in rear final drive, checking**.
- Attach drive axles.

Refer to **42 - REAR SUSPENSION** ; Removing and installing drive axle

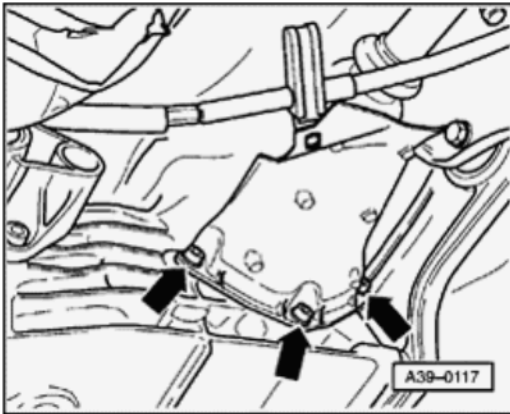


Fig. 34: Removing/Installing Heat Shields From Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach heat shields to final drive -arrows-.

Tightening torques

Component	Nm
Drive flange on rear final drive	25
Heat shields on rear final drive	23

DRIVE SHAFT FLANGE SEAL, REPLACING

Drive shaft flange seal, replacing

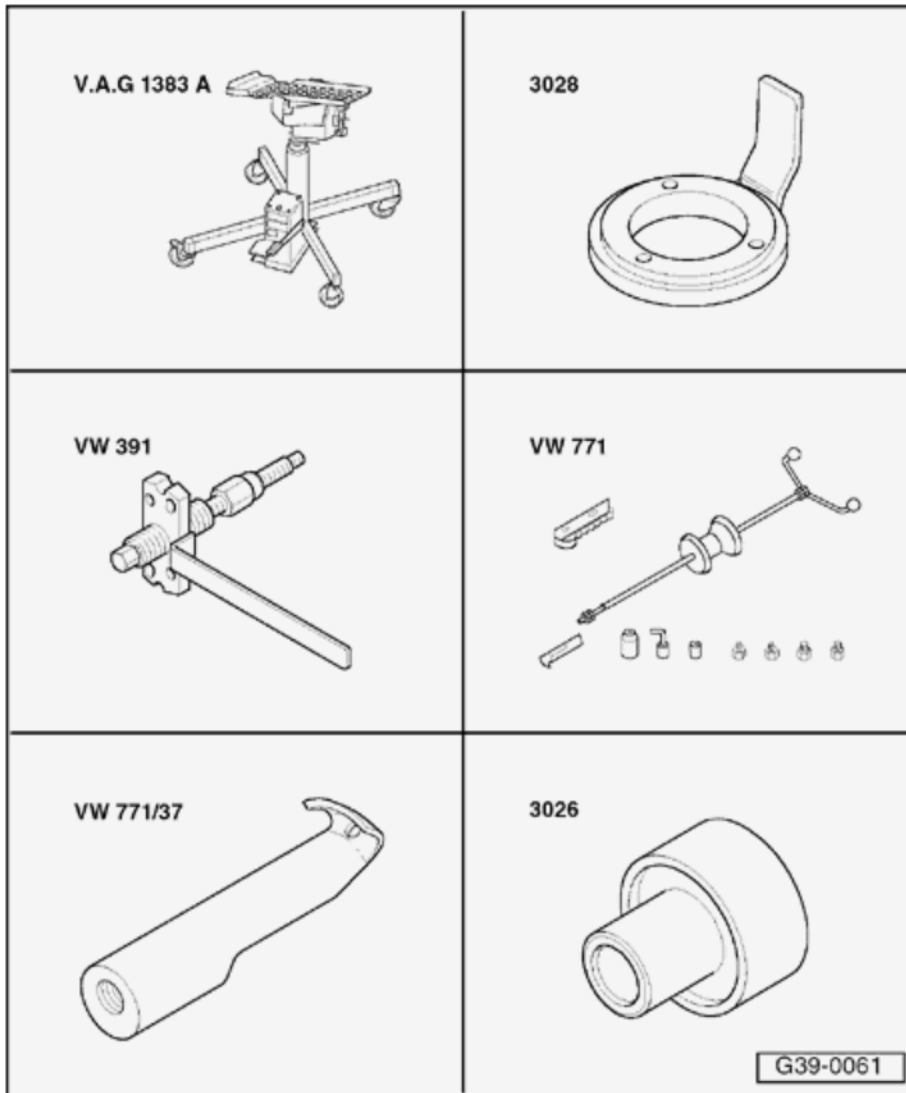
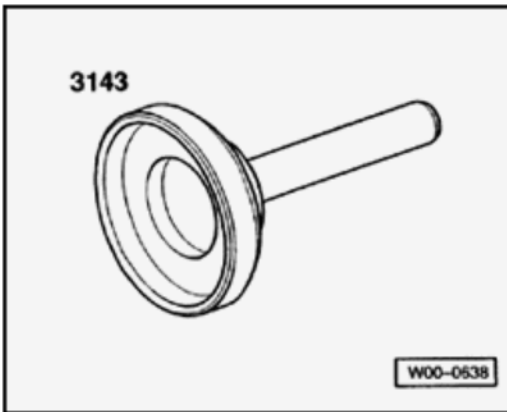


Fig. 35: Identifying Special Tools - Drive Shaft Flange Seal, Replacing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

The following special tools and testing devices are required:

- V.A.G 1383A Engine/transmission jack with universal mounting V.A.G 1359/2
- 3028 - Retainer
- VW 391 -Puller
- VW 771 - Slide hammer-complete set
- VW 771/37 Additional part for VW 771
- 3026 - Mandrel

**Fig. 36: Drive Pinion 3143**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive pinion 3143
- Rear final drive installed
- Observe general repair instructions. Refer to **Repair instructions**

Removing

- Remove rear section of exhaust system as from clamp(s):

Refer to

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

; Removing and installing exhaust-system components

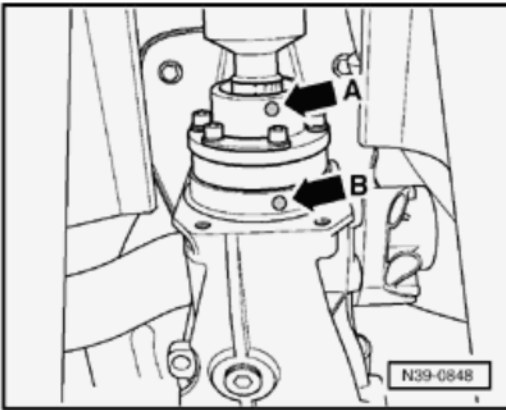


Fig. 37: Markings On Driveshaft Flange (Dots)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether there is a factory marking (paint dot) on drive shaft. If you do not find one, mark the position of the constant velocity joint -arrow A- relative to the rear final drive -arrow B- with a colored dot
- Disconnect drive shaft from rear final drive and tie it up to exhaust system brackets. Refer to **Drive shaft, removing and installing**.
- Place engine/transmission jack V.A.G 1383 A with universal transmission mounting 1359/2 under final drive and secure final drive.

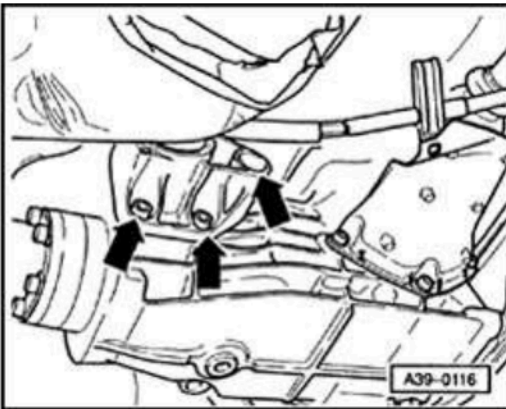


Fig. 38: Removing/Installing Securing Bolts At Transmission Support

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts -arrows- of left final drive support.
- Carefully lower final drive until flange is freely accessible.
- Color-mark the position of the securing nut for the drive pinion.

Calculate dimension "a" and dimension "b"

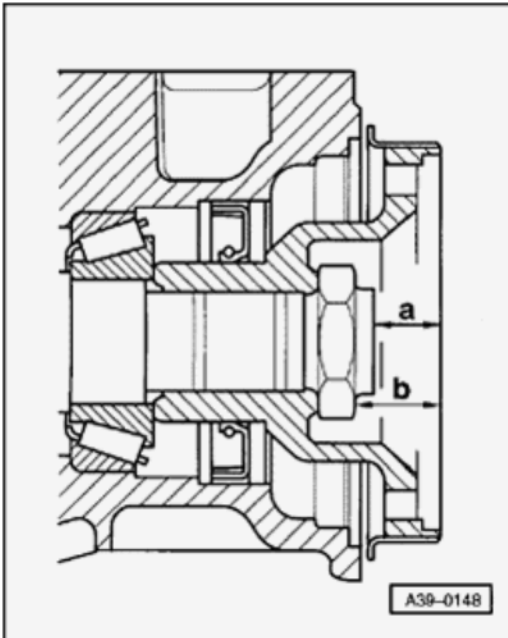


Fig. 39: Determining Dimension "A" And Dimension "B"
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Distance of flange to drive pinion =

Dimension a

- Distance of flange to securing nut for the drive pinion =

Dimension b

- Note calculated dimensions
- Count turns when unscrewing the securing nut and make a note of them.

NOTE: Illustrations show the final drive removed for the following procedure.

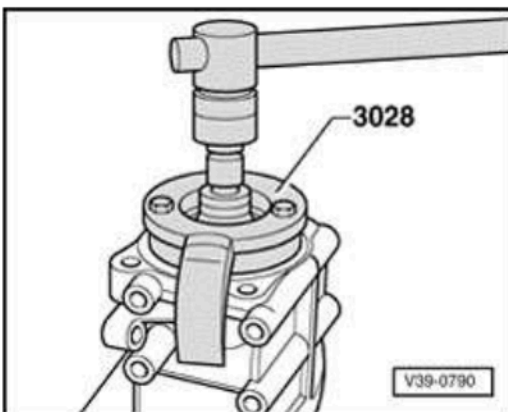


Fig. 40: Screw On Retainer 3028 And Unscrew Securing Nut For Drive Pinion

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install support tool 3028 and remove drive pinion nut.
- Place drip tray underneath to collect oil.

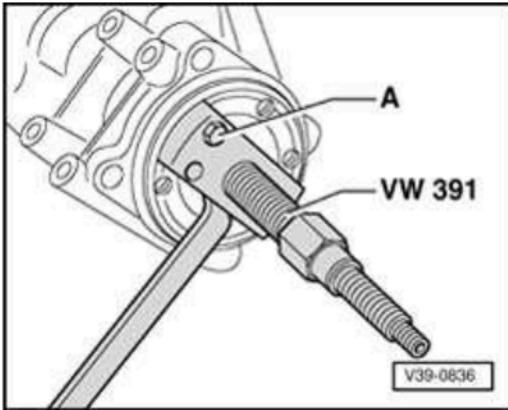


Fig. 41: Pull Off Flange Using Puller VW 391

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Detach flange with removal tool VW 391.

A - Screw in two hex bolts M8 x 30 into flange.

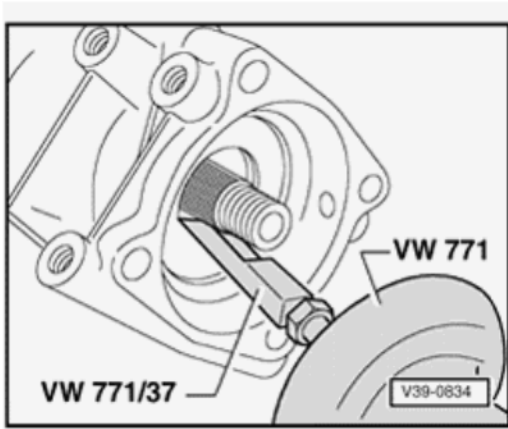


Fig. 42: Pulling Out Sealing Ring

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove sealing ring.

Installing

Installation is carried out in reverse order. Note the following:

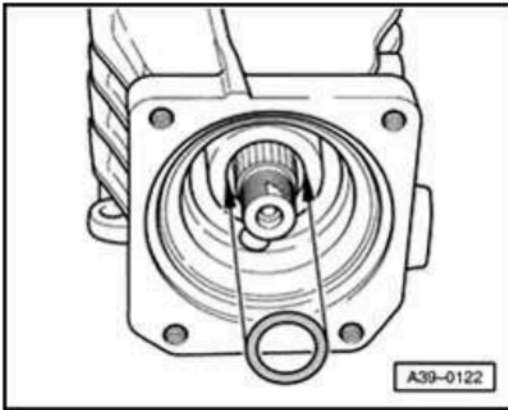


Fig. 43: Inserting O-Ring

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-ring between drive pinion bearing and flange.
- Lightly oil O-ring before installing.
- Pack space between sealing and dust lips half-full with sealing grease G 052 128 A1.
- Lightly oil outer circumference of seal.

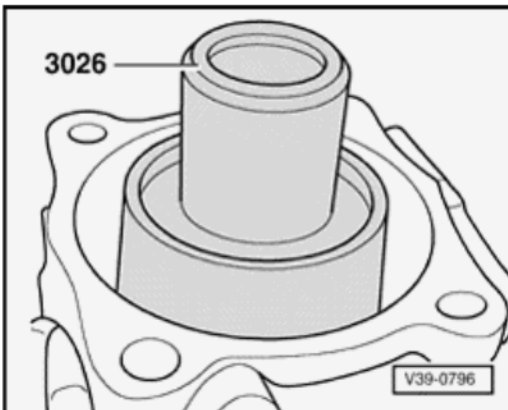


Fig. 44: Driving In Seal For Driveshaft Flange

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in seal for drive shaft flange onto stop with drift 3026.

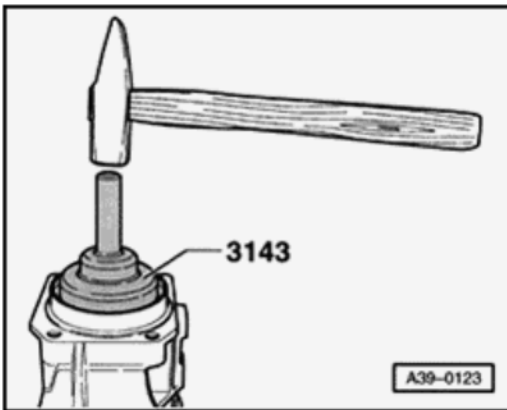


Fig. 45: Driving Drive Shaft Flange Onto Drive Pinion

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive shaft flange onto drive pinion until securing nut can be mounted.

NOTE: Use the old hex nut to reattach the flange to the drive pinion. Otherwise the original installed position will not be relocated.

- Clean drive pinion nut and threads on drive pinion of oil and grease residues. Thinly coat threads with locking fluid D 000 600.

NOTE: The number of turns when reattaching must be the same as during unscrewing.

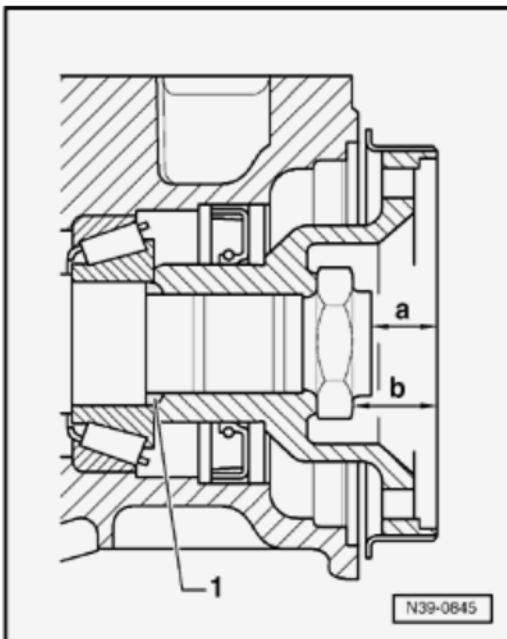


Fig. 46: Checking Dimension "A" And Dimension "B"

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Perform control measurement - check dimension "a" and dimension "b". Refer to **Calculate dimension "a"**

and dimension "b" onward.

NOTE:

- O-ring -1- must be installed when measuring.
- The hex nut must be returned to exactly the marked position.
- Maximum permissible deviation from original measurements: ± 0.3 mm.

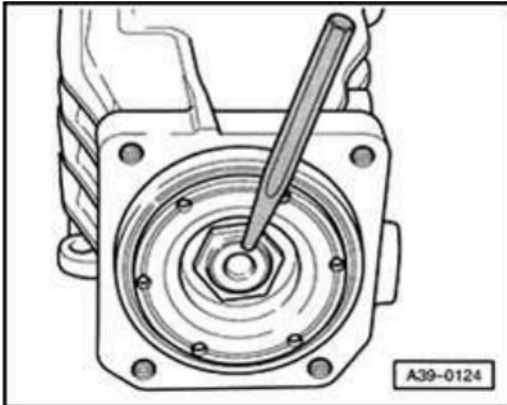


Fig. 47: Locking Drive Pinion Hexagon Nut

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lock hex nut.
- Move final drive back to installation position.

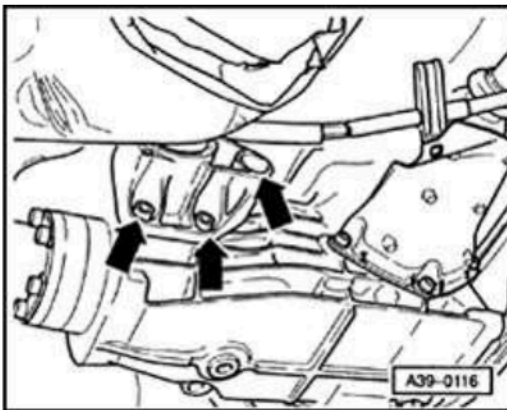


Fig. 48: Removing/Installing Securing Bolts At Transmission Support

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw final drive to front mounting bracket -arrows-.
- Top off gear oil in rear final drive and check oil level. Refer to **Gear oil level in rear final drive, checking.**
- If there was a factory marking at the drive shaft determine now the radial run-out at the flange/drive shaft. Refer to **Drive shaft flange, measuring and marking radial run-out.** Attach drive shaft in such a way that the color coding at the drive shaft are aligned with new marking at flange.
- If the position of the drive shaft relative to the flange/drive shaft were marked before removal the drive

shaft must be reattached at same position. Refer to **Drive shaft, removing and installing**.

Observe installation instructions. Refer to **Drive shaft, servicing**

- Replace seal on drive shaft flange and tighten drive shaft to torque. Refer to **Drive shaft, removing and installing**.
- Stress-free alignment of exhaust system:

Refer to

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

; Removing and installing exhaust-system components

Tightening torques

Component	Nm
Front transmission support on final drive	40
Drive shaft on rear final drive	55

REAR FINAL DRIVE, REMOVING AND INSTALLING

Rear final drive, removing and installing

Special tools, testers and auxiliary equipment required

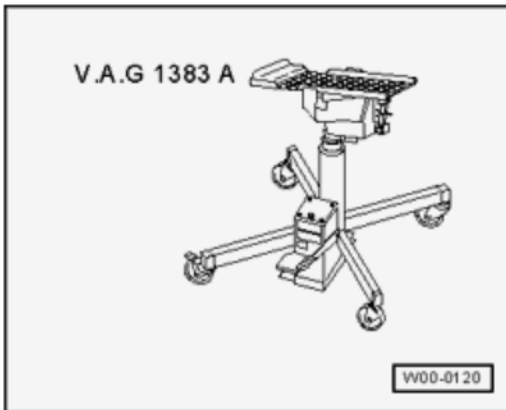


Fig. 49: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack V.A.G 1383 A with universal transmission mounting V.A.G 1359/2

Removing

- Remove rear section of exhaust system as from clamp(s):

Refer to

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

; Removing and installing exhaust-system components

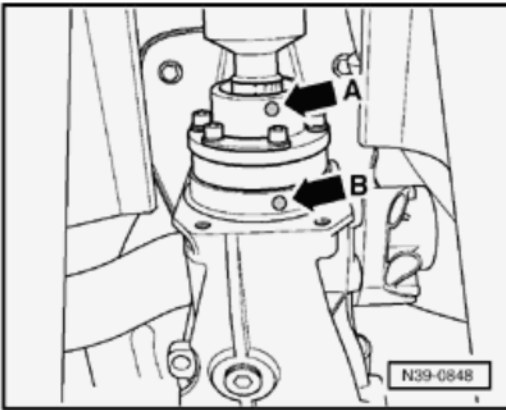


Fig. 50: Markings On Driveshaft Flange (Dots)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether there is a factory marking (paint dot) on drive shaft. If you do not find one, mark position of the drive shaft flange -arrow A- relative to rear final drive -arrow B- with a colored dot.
- Remove drive shaft from rear final drive. Refer to **Drive shaft, removing and installing**

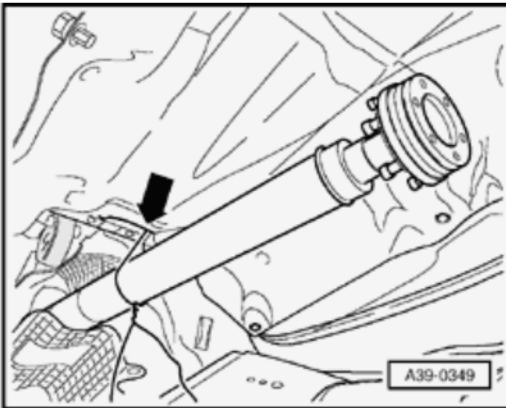


Fig. 51: Tying Drive Shaft To Exhaust System Bracket Using Wire

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tie drive shaft to exhaust system bracket using a wire.
- Remove heat shields for drive axles at final drive.
- Remove drive axles from left and right from the flanges of the rear final drive.

Refer to **42 - REAR SUSPENSION** ; Removing and installing drive axle

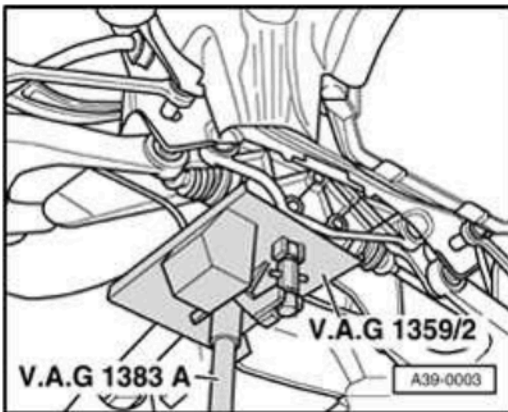


Fig. 52: Place Engine/Transmission Jack V.A.G 1383 A With Universal Transmission Support V.A.G 1359/2 Under Final Drive And Secure Final Drive

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place engine/transmission jack V.A.G 1383 A with universal transmission mounting 1359/2 under rear final drive and secure rear final drive.

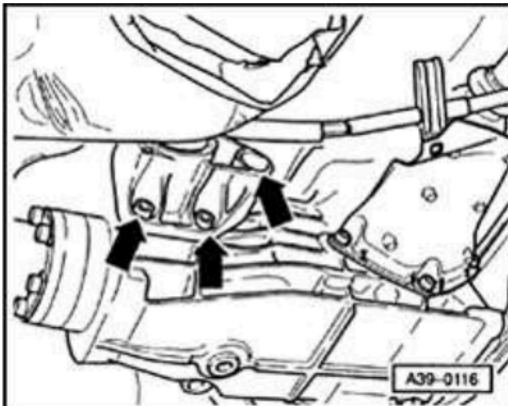


Fig. 53: Removing/Installing Securing Bolts At Transmission Support

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts of mounting bracket of rear final drive -arrows-.

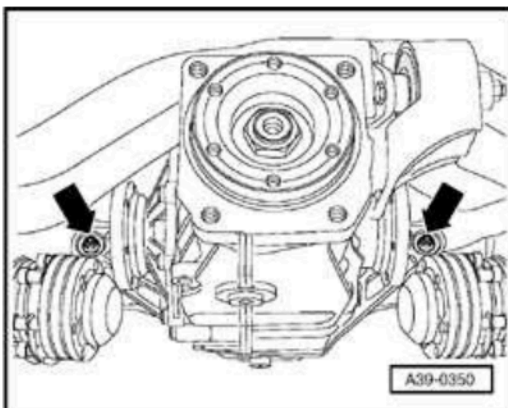


Fig. 54: Removing Nuts From Left/Right Of Cross Piece
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nuts -arrows- from left and right of cross piece.
- Pull bolts out of subframe as far as possible.

NOTE: **The bolts remain in the subframe.**

- Slightly lower rear section of final drive.
- Move drive axles clear toward top.
- Lower rear section of final drive.

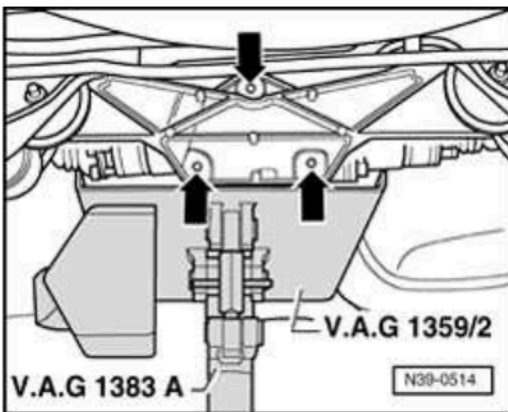


Fig. 55: Removing/Installing Securing Bolts From Crossmember
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If rear final drive is replaced then remove rear cross piece -arrows-.

Installing

Installation is carried out in reverse order. Note the following:

NOTE:

- **Always replace self-locking nuts.**
- **It is essential that the residues of locking fluid are cleaned out from the threaded holes in flange shaft on the rear final drive after removing the drive shaft. Otherwise there is a danger that the new bolts will seize and then shear when removing them again.**
- **The threaded holes can be cleaned with a thread tap.**
- **Replace drive shaft bolts (self-locking).**
- **Replace gaskets on flange shaft (detach protective foil and stick gasket onto flange shaft).**

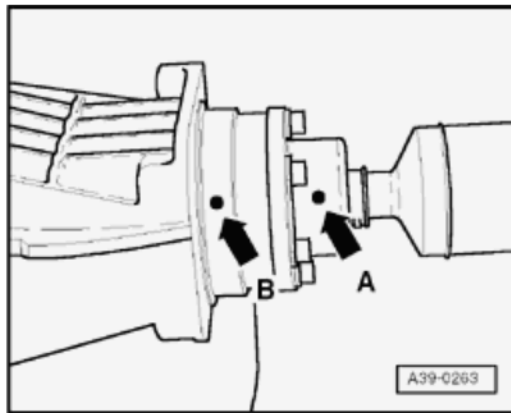


Fig. 56: Driveshaft, Removing And Installing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- To prevent imbalance, the flanges must be installed so that the paint markings align -arrows A and B-. Install drive shaft. Refer to Installing.
- When lifting rear final drive, position drive axle onto flange shaft.
- Lift final drive past the right-hand drive axle until installation position.

NOTE: All components must move freely.

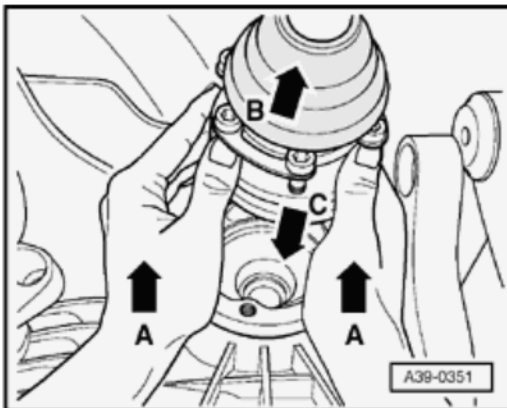


Fig. 57: Pushing Rear Final Drive At Left-Hand Drive Axle Upward & Constant Velocity Joint Of Drive Axle Outward Until Limit Stop And Lower Toward Flange Shaft
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push rear final drive at left-hand drive axle upward -arrows A-.
- While doing so push constant velocity joint of the drive axle outward until limit stop -arrow B- and lower toward flange shaft -arrow C-.

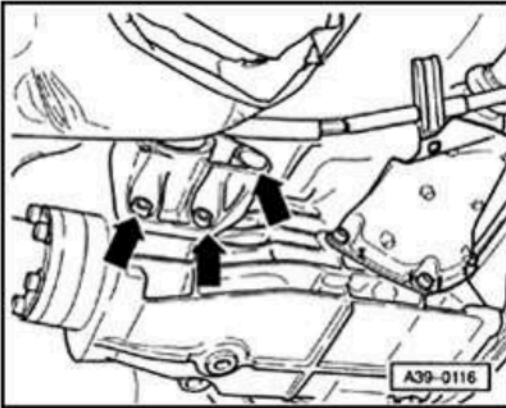


Fig. 58: Removing/Installing Securing Bolts At Transmission Support
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove securing bolts of mounting bracket of rear final drive -arrows-.
- Push bolts in subframe into cross piece until limit stop.

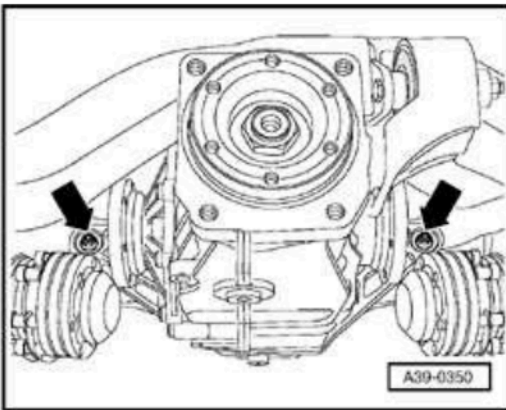


Fig. 59: Removing Nuts From Left/Right Of Cross Piece
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure nuts on left and right at cross piece -arrows-.

Observe installation instructions. Refer to **Drive shaft, servicing**

- Replace seal on drive shaft flange and tighten drive shaft to torque. Refer to **Drive shaft, removing and installing**.
- Attach drive axles.

Refer to **42 - REAR SUSPENSION** ; Removing and installing drive axle

- Top off gear oil in rear final drive and check oil level. Refer to **Gear oil level in rear final drive, checking**.
- Install exhaust system and align stress-free:

Refer to

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

; Removing and installing exhaust-system components

Tightening torques

Component	Nm
Rear final drive to cross member -arrows-	55
Rear final drive to cross member -arrows-	55

Component	Nm
Rear final drive to mounting bracket -arrows-	40
Drive shaft to rear final drive	55
Heat shields to rear final drive	23

Rear final drive, attaching to assembly bracket

Special tools, testers and auxiliary equipment required

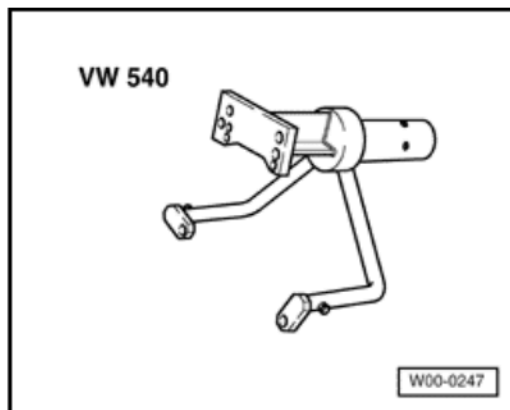


Fig. 60: Holding Fixture VW 540

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Holding fixture VW 540

Secure complete rear final drive on a repair stand with bracket VW 540

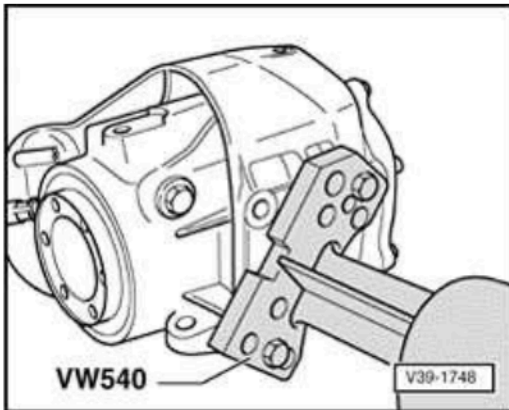


Fig. 61: Clamp Rear Final Drive In Assembly Fixture
Courtesy of VOLKSWAGEN UNITED STATES, INC.

REAR FINAL DRIVE, DISASSEMBLING AND ASSEMBLING

Assembly overview

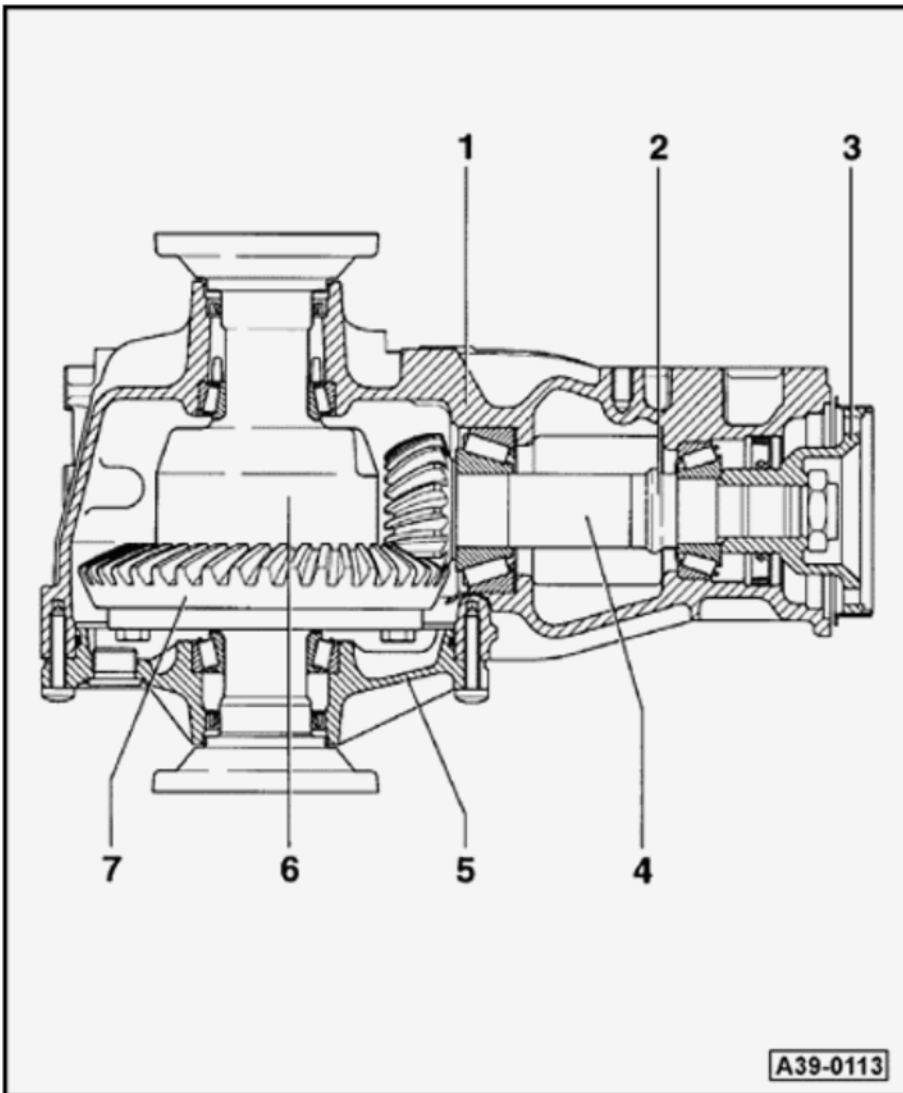


Fig. 62: Rear Final Drive, Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Final drive housing

2 - Spacer sleeve

- Replace

3 - Flange for drive shaft

- Removing and installing. Refer to **Drive pinion, removing and installing and disassembling and assembling**

4 - Pinion shaft

- Is mated with ring gear, replace together as a set
- Removing and installing. Refer to **Drive pinion, removing and installing and disassembling and assembling**

5 - Final drive cover**6 - Differential**

- Removing and installing. Refer to **Differential, removing and installing**
- Disassembling and assembling. Refer to **Differential, disassembling and assembling**

7 - Ring gear

- Paired with pinion shaft (final drive set)
- Removing and installing. Refer to **Differential, disassembling and assembling**.

DIFFERENTIAL, REMOVING AND INSTALLING**Differential, removing and installing****NOTE:**

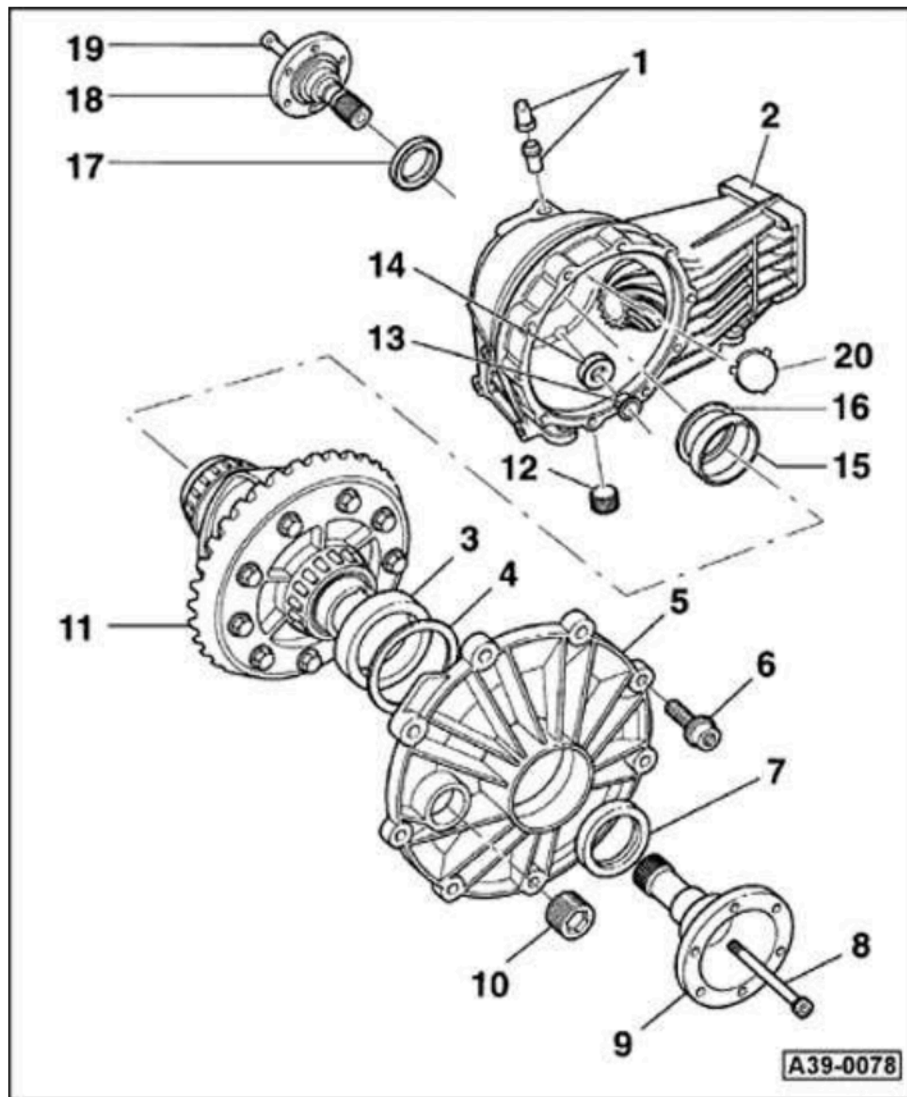


Fig. 63: Rear Differential, Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- General repair instructions. Refer to Repair instructions.
- Adjustments are required when replacing components marked 1). Refer to Adjustment overview.

Secure final drive on a repair stand. Refer to Rear final drive, attaching to assembly bracket.

1 - Vent sleeve

- With rubber valve
- Installation position. See Fig. 67.

2 - Final drive housing 1)

- Removing and installing drive pinion. Refer to **Drive pinion, removing and installing and disassembling and assembling**.

3 - Outer race for large taper roller bearing 1)

- Removing and installing. Refer to **Differential, disassembling and assembling**.

4 - Shim "S1"

- Note thickness
- Adjustment overview. Refer to **Adjustment overview**.

5 - Cover for final drive 1)

- With O-ring
- Replace O-ring
- Insert O-ring with oil

6 - TORX-screw - 25 Nm

7 - Seal, right

- Replacing. Refer to **Flange shaft oil seals, replacing**.

8 - Hex socket-head bolt - 25 Nm

9 - Flange shaft, right

- Removing and installing. See **Fig. 65**

10 - Oil filler plug - 35 Nm

- Checking gear oil level in rear final drive. Refer to **Gear oil level in rear final drive, checking**

11 - Differential with ring gear 1)

- Disassembling and assembling. Refer to **Differential, disassembling and assembling**

12 - Oil drain plug, 35 Nm

13 - Socket

- Holds solenoid in position
- Drive in onto stop

14 - Solenoid**15 - Outer race for small taper roller bearing 1)**

- Removing and installing. Refer to Differential, disassembling and assembling.

16 - Shim "S2"

- Note thickness
- Adjustment overview. Refer to Adjustment overview

17 - Seal, left

- Replacing. Refer to Flange shaft oil seals, replacing.

18 - Flange shaft, left

- Removing and installing. See Fig. 65

19 - Hex socket-head bolt - 25 Nm**20 - Cap**

- Installing. See Fig. 66

Secure final drive on repair stand

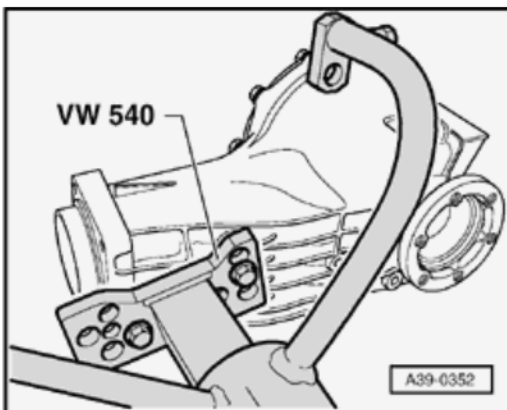


Fig. 64: Clamping Rear Final Drive In Assembly Fixture
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Removing and installing flange shaft

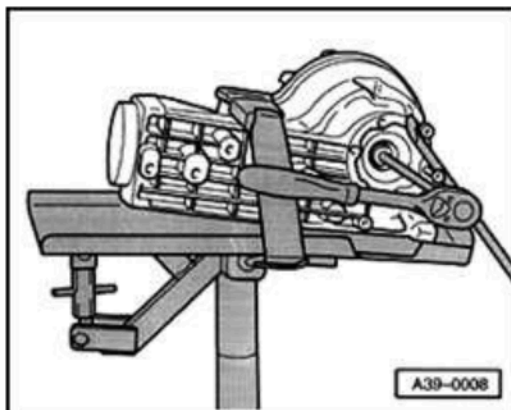


Fig. 65: Removing/Installing Drive Flange

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Press in cover until stop

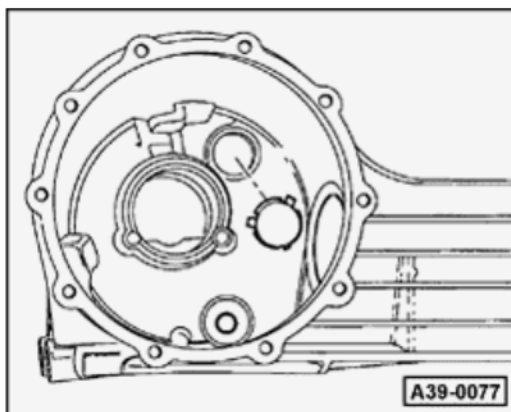


Fig. 66: Pressing In Cover Up To Stop

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation position vent sleeve

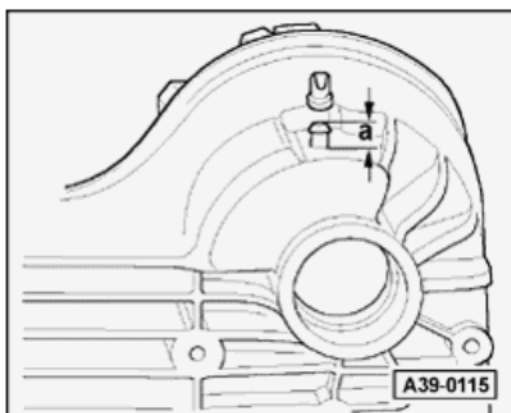


Fig. 67: Installed Location Of Breather Sleeve

Courtesy of VOLKSWAGEN UNITED STATES, INC.

The vent sleeve must protrude from the housing by 13 mm (dimension -a-) after being pressed in.

The slot in rubber valve is located longitudinally in direction of travel.

Removal

- Rear final drive removed

Special tools, testers and auxiliary equipment required

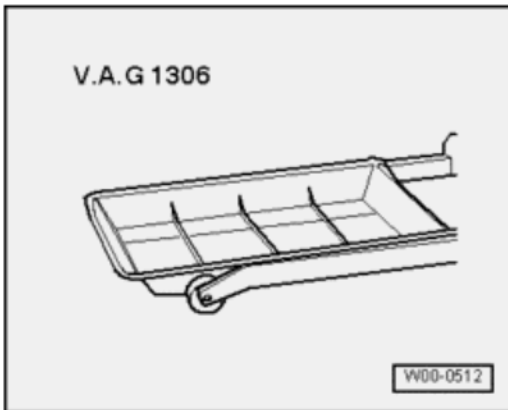


Fig. 68: Identifying Drip Tray V.A.G 1306

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray V.A.G 1306
 - Clamp complete rear final drive into assembly bracket VW 540. Refer to **Rear final drive, attaching to assembly bracket.**
 - Place drip tray underneath to collect oil.
 - Drain gear oil.

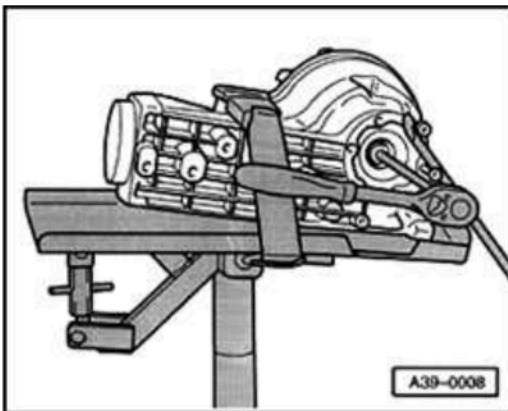


Fig. 69: Removing/Installing Drive Flange

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove left and right-hand flange shafts.
- To loosen the securing bolt, screw two bolts into flange shaft and counter-hold with a lever.
- Mark flange shafts (left and right) and pull out.
- Remove securing bolts from cover for final drive.
- Take cover for final drive off axle housing and remove differential.

Installing

Installation is in reverse order.

- Insert differential.
- Replace O-ring for cover for final drive and oil when installing.
- Install cover for final drive onto axle housing and using diagonal sequence tighten to 25 Nm.
- Fill space between sealing lip and dust lip with a thin layer of sealing grease G052 128 A1.

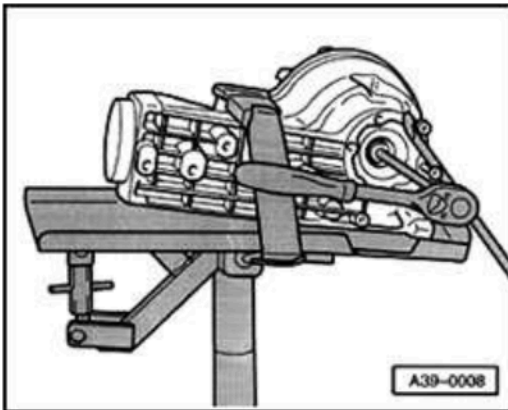


Fig. 70: Removing/Installing Drive Flange

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert flange shafts and tighten to 25 Nm.
- Top off gear oil in rear final drive and check oil level. Refer to **Gear oil level in rear final drive, checking.**

DIFFERENTIAL, DISASSEMBLING AND ASSEMBLING

Differential, disassembling and assembling

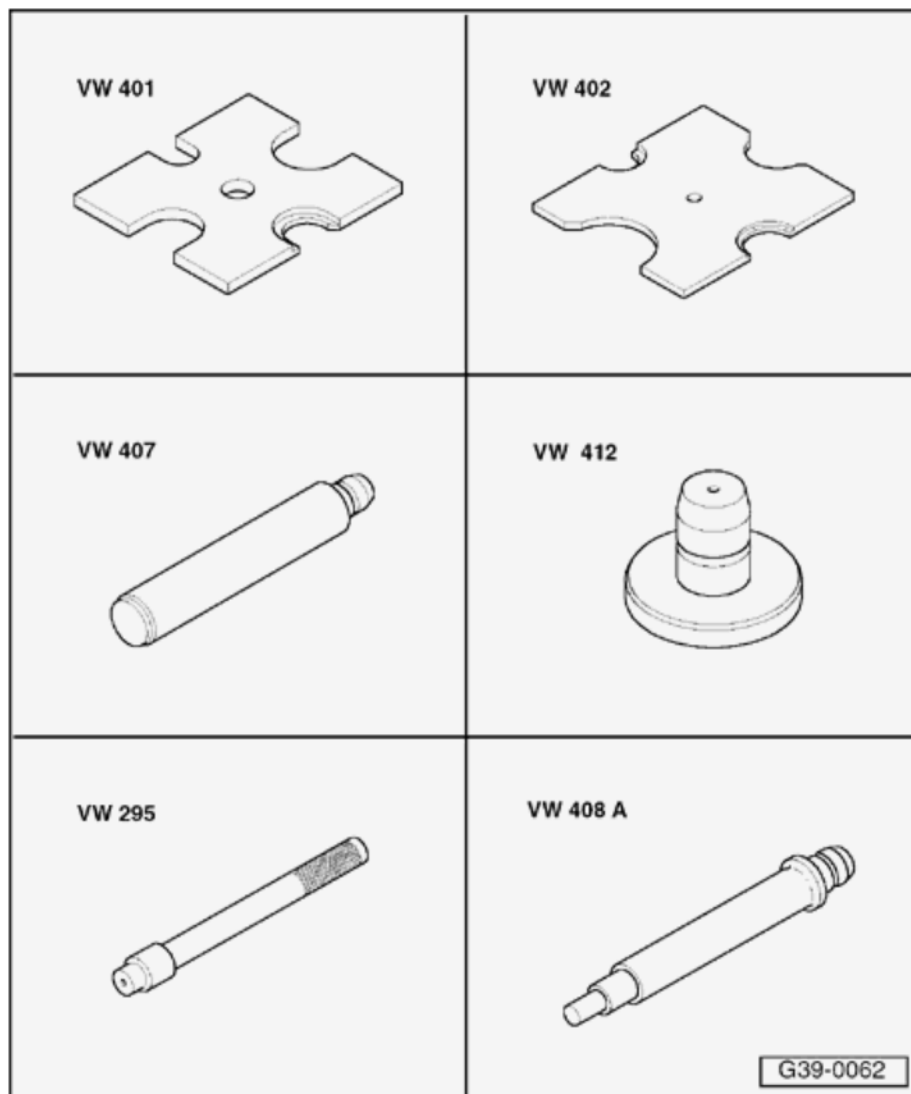


Fig. 71: Identifying Special Tools - Differential, Disassembling And Assembling (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

The following special tools and testing devices are required:

- Thrust plate VW 401
- Thrust plate VW 402
- Punch VW 407
- Thrust disc VW 412
- Needle bearing drift VW 295
- Punch VW 408 A

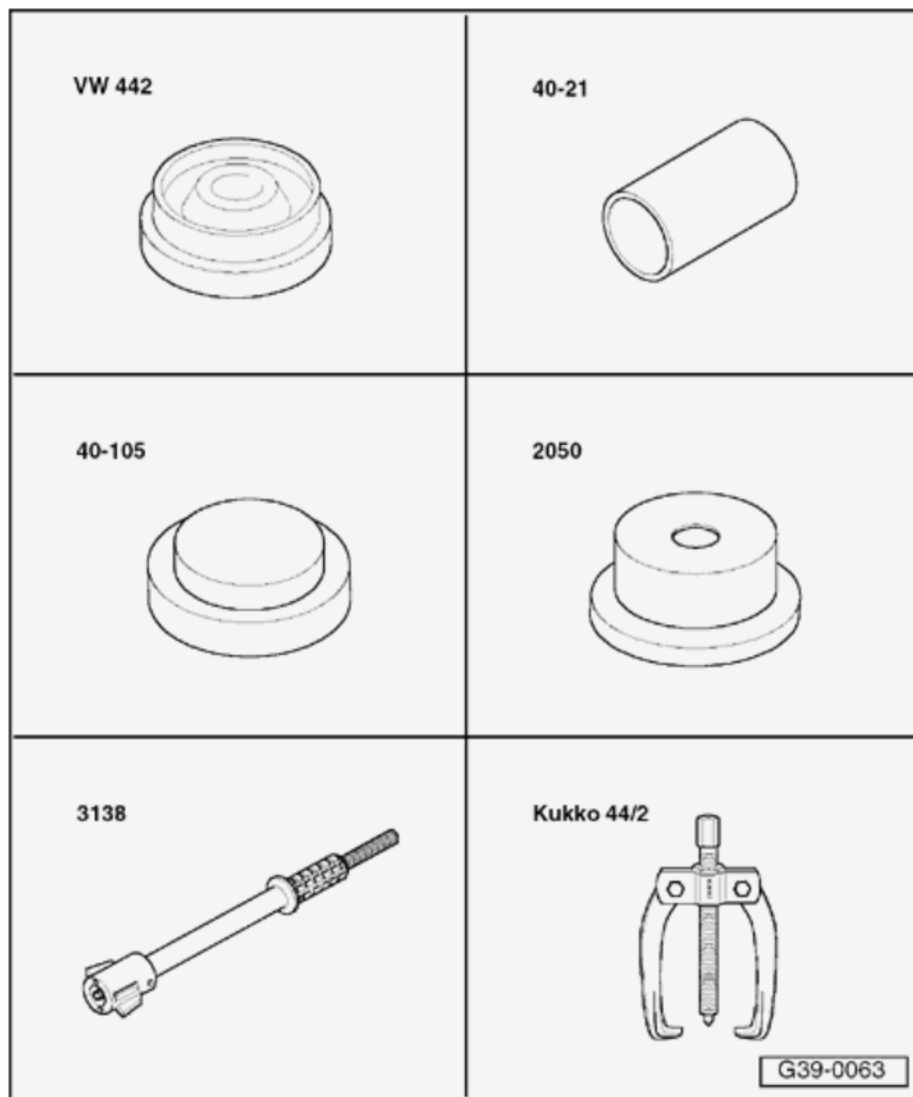


Fig. 72: Identifying Special Tools - Differential, Disassembling And Assembling (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thrust pad VW 442
- Sleeve 40-21
- Thrust piece 40-105
- Thrust plate 2050
- Drift 3138
- Two-arm puller Kukko 44/2

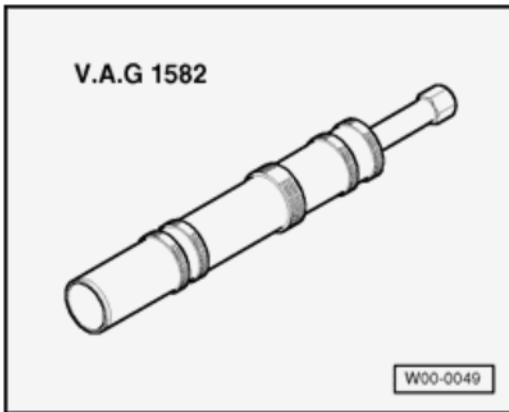


Fig. 73: Tapered Roller Bearing Puller V.A.G 1582
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Taper roller bearing extractor V.A.G 1582

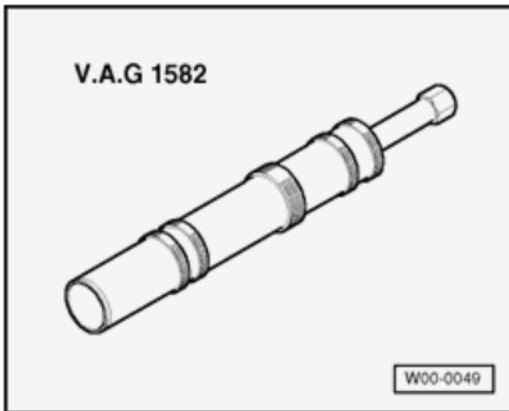


Fig. 74: Tapered Roller Bearing Puller V.A.G 1582
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- V.A.G 1582/6

NOTE:

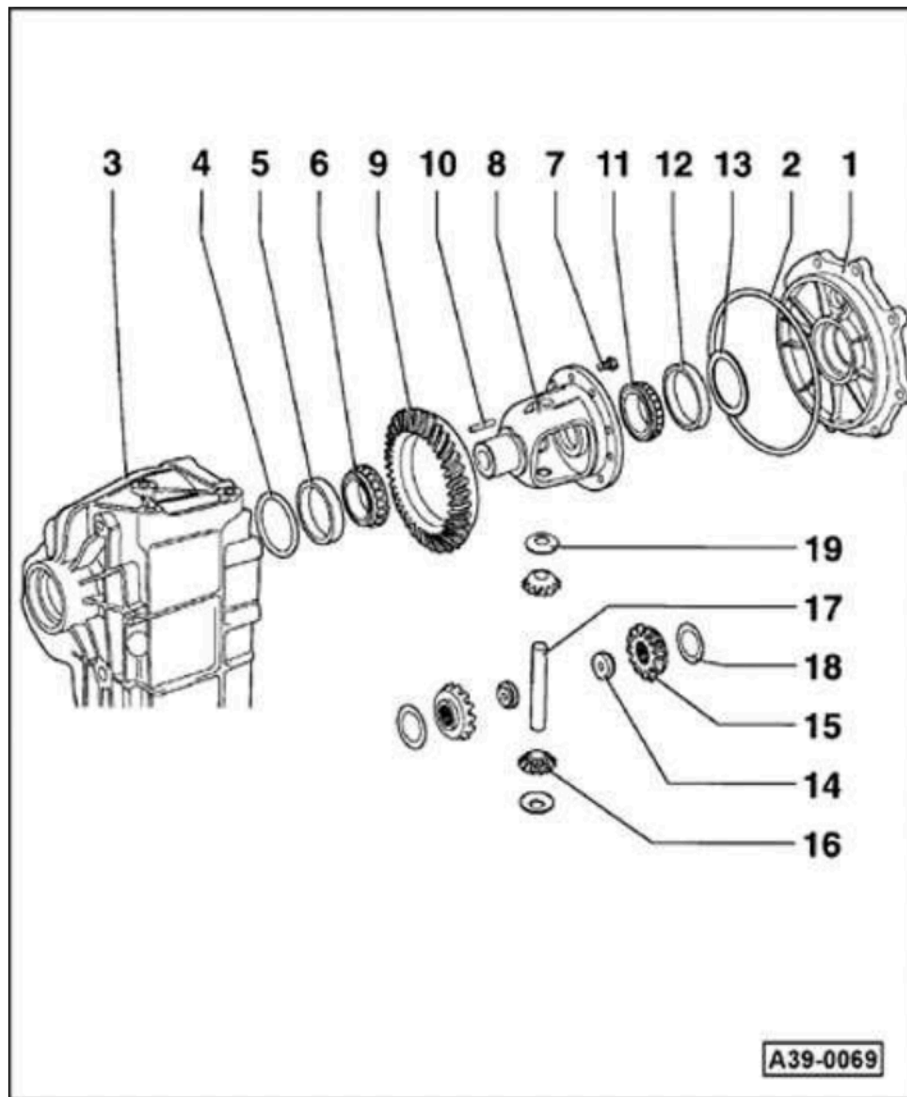


Fig. 75: Rear Differential, Overview

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- General repair instructions. Refer to Repair instructions.
- Secure final drive on a repair stand. Refer to Secure complete rear final drive on a repair stand with bracket VW 540.
- Replace both taper roller bearings together.
- When replacing the parts marked with 1) adjustment work is required. Refer to Adjustment overview.

1 - Cover for final drive 1)

2 - O-ring

- Replace

- Insert with oil

3 - Final drive housing 1)

4 - Shim "S1"

- Note thickness
- Adjustment overview. Refer to Adjustment overview.

5 - Outer race for small taper roller bearing 1)

- Tapping out. See Fig. 76
- Pressing in. See Fig. 77

6 - Inner race for small taper roller bearing 1)

- Pulling off. See Fig. 78
- Pressing on. See Fig. 79

7 - Bolt - 60 Nm plus an additional 45° 1/4 turn

- Replace
- Allocation
- Lightly tighten bolts then tighten diagonally to specified torque.

8 - Differential housing 1)

9 - Ring gear 1)

- Paired with pinion shaft (final drive set)
- Allocation based on transmission code letters
- Drive off housing with a drift. See Fig. 84
- Install to differential housing. See Fig. 85

10 - Spring pin

- For securing shaft for bevel gears
- Drive in flush

11 - Inner race for large taper roller bearing 1)

- Pulling off. See Fig. 80

- Pressing on. See [Fig. 81](#)

12 - Outer race for large taper roller bearing 1)

- Tapping out. See [Fig. 82](#)
- Pressing in. See [Fig. 83](#)

13 - Shim "S2"

- Note thickness
- Adjustment overview. Refer to [Adjustment overview](#).

14 - Threaded piece

15 - Large bevel gear

- Installing. See [Fig. 86](#)
- Adjusting. See [Fig. 87](#)

16 - Small bevel gear

- Installing. See [Fig. 86](#)

17 - Shaft for planet wheels

- Drive out with drift

18 - Adjustment shim

- Redefine thickness. See [Fig. 87](#)

19 - Thrust washer

- Check for cracks

Driving small taper roller bearing outer race out of cover

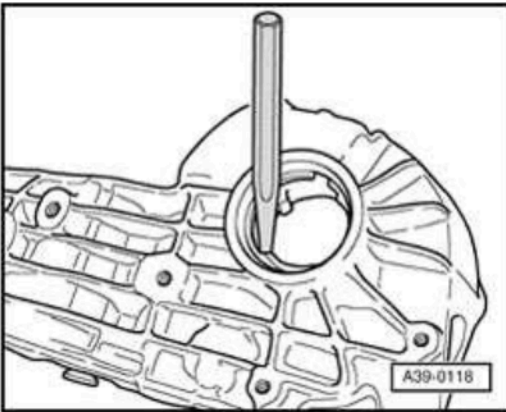


Fig. 76: Driving Small Tapered Bearing/Outer Race Out Of Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- After removing check shims for damage.

Pressing in taper roller bearing outer race small until stop into housing

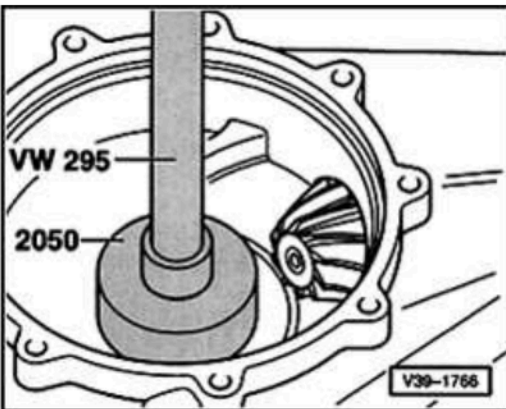


Fig. 77: Pressing Small Tapered Bearing/Outer Race Into Housing To Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Pulling off inner race for small taper roller bearing

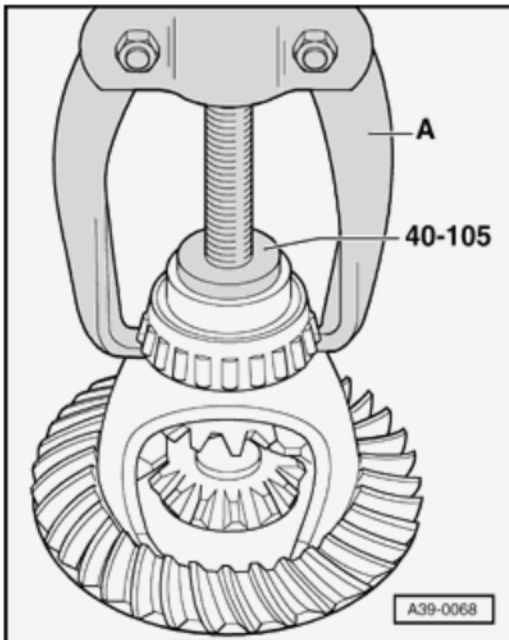


Fig. 78: Pulling Off Small Inner Race/Tapered Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Two arm puller, e.g. Kukko 44/2

Pressing on small taper roller bearing inner race

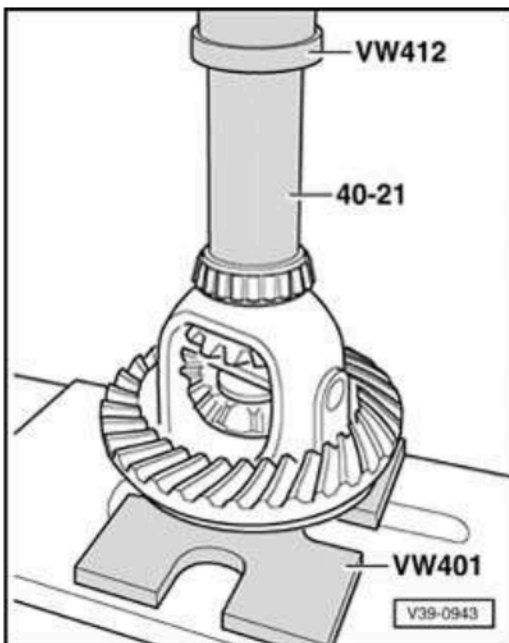


Fig. 79: Pressing On Small Tapered Bearing Inner Race
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

WARNING: WARNING!

Wear protective gloves!

- Heat inner race to approx. 100°C, position and push to final position.

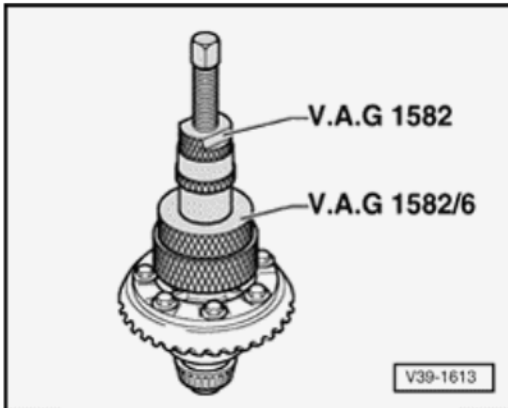
Pulling off inner race for large taper roller bearing

Fig. 80: Pulling Off Large Inner Race/Tapered Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install thrust plate 40-105 onto differential housing before installing puller.

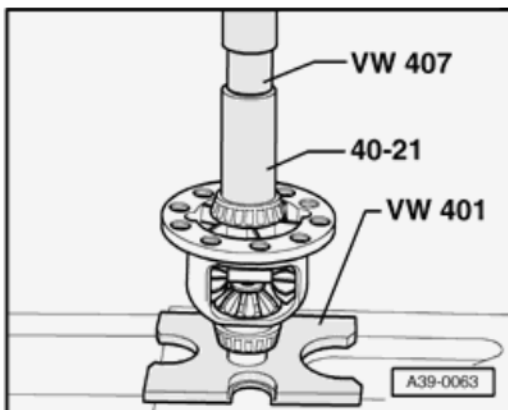
Pressing on large taper roller bearing inner race

Fig. 81: Pressing On Inner Race Of Large Taper Roller Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WARNING: WARNING!**Wear protective gloves!**

- Heat inner race to approx. 100°C, position and push to final position.

Driving out outer race for large taper roller bearing out of cover

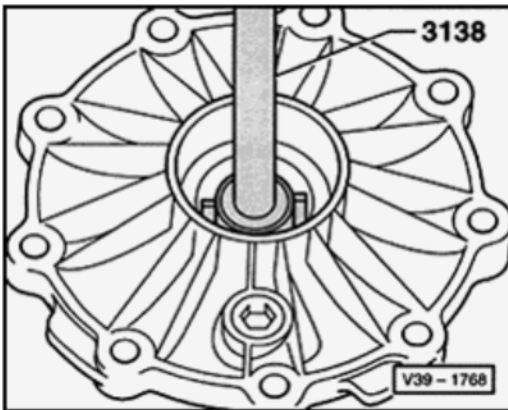


Fig. 82: Driving Off Outer Race/Tapered Bearing From Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- After removing check shims for damage.

Pressing in outer race for large taper roller bearing into cover

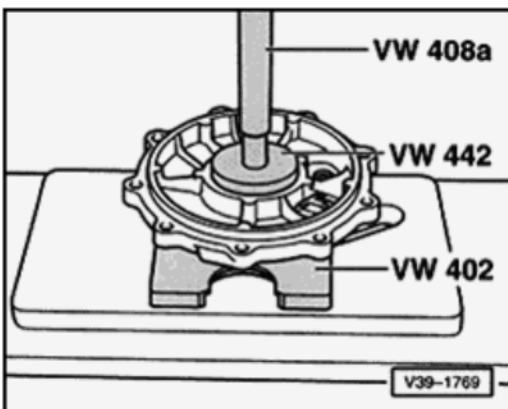


Fig. 83: Pressing Outer Race/Tapered Bearing Into Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Driving ring gear off housing

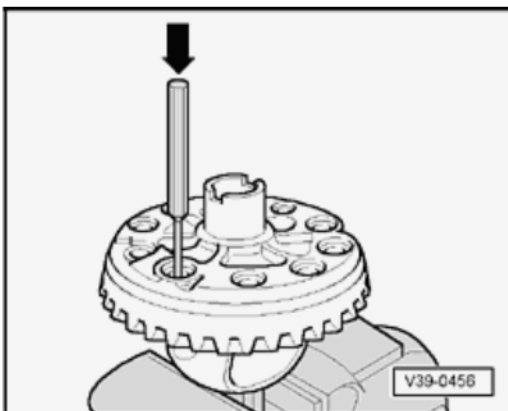


Fig. 84: Driving Out Ring Gear From Housing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installing ring gear

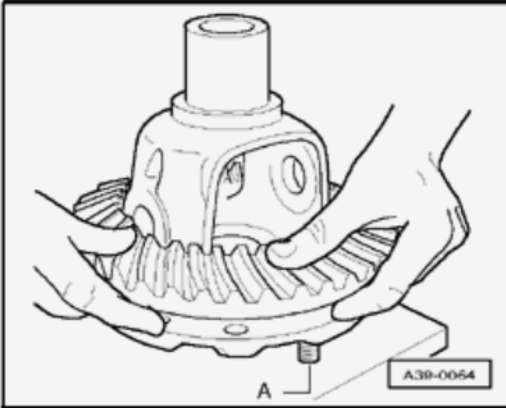


Fig. 85: Installing Ring Gear

Courtesy of VOLKSWAGEN UNITED STATES, INC.

WARNING: WARNING!

Wear protective gloves!

- Locate ring gear guide with centering pins -A- (self-produced) when mounting.
- Heat ring gear to approx. 100°C and position.

Installing small bevel gears

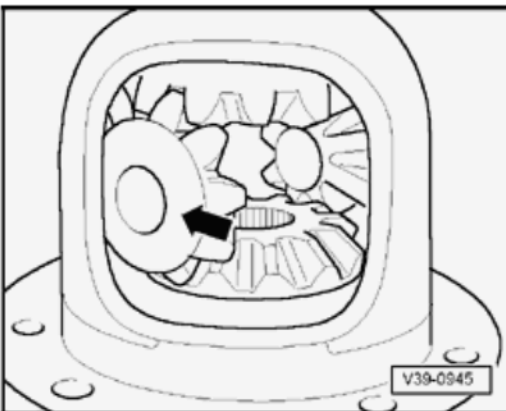


Fig. 86: Installing Small Differential Bevel Gears

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If large bevel gears have been replaced, measure and select new shims. See **Fig. 87**.
- Insert large bevel gears with recalibrated shims.
- Insert small bevel gears spaced 180° apart, and then rotate into place -arrow-.
- Insert washers and align.

- Insert threaded pieces.
- Drive small bevel gear shaft into final position and secure.

Adjusting differential bevel gears

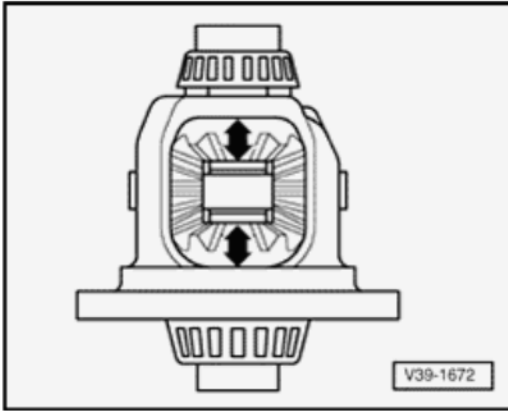


Fig. 87: Differential Planetary Gears, Adjusting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert large bevel gears with thinnest shims (0.5 mm).
- Insert small bevel gears at a 180° offset with thrust washers.

NOTE: Do not now interchange bevel gears and thrust washers.

- Drive in shaft for bevel gears.
- Press small bevel gears outward.
- Press large bevel gears in direction of -arrow- and check play.
- Ascertain the thickest - just fitting - shim for large bevel gears on each side.
- Select required shims from table. Part numbers

The following shims are available:

Shim thickness (mm)		
0.50	0.70	0.90
0.60	0.80	1.00

NOTE:

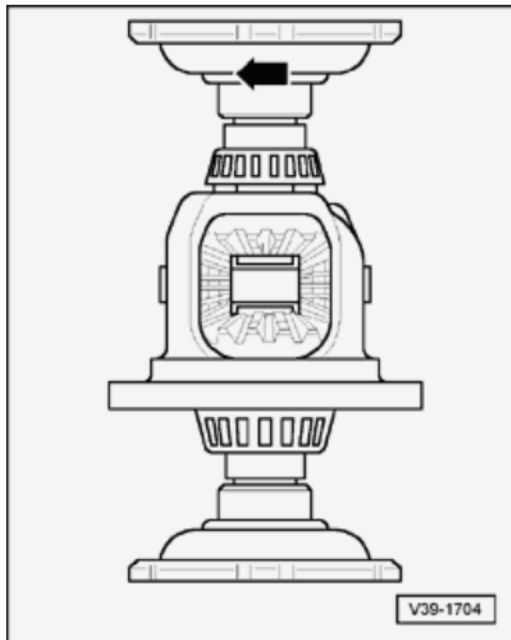


Fig. 88: Installing Differential Bevel Gear Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

The adjustment is also correct if no further play is perceptible, although it is still possible to rotate the differential bevel gears -arrow-.

DRIVE PINION, REMOVING AND INSTALLING AND DISASSEMBLING AND ASSEMBLING

Drive pinion, removing and installing and disassembling and assembling

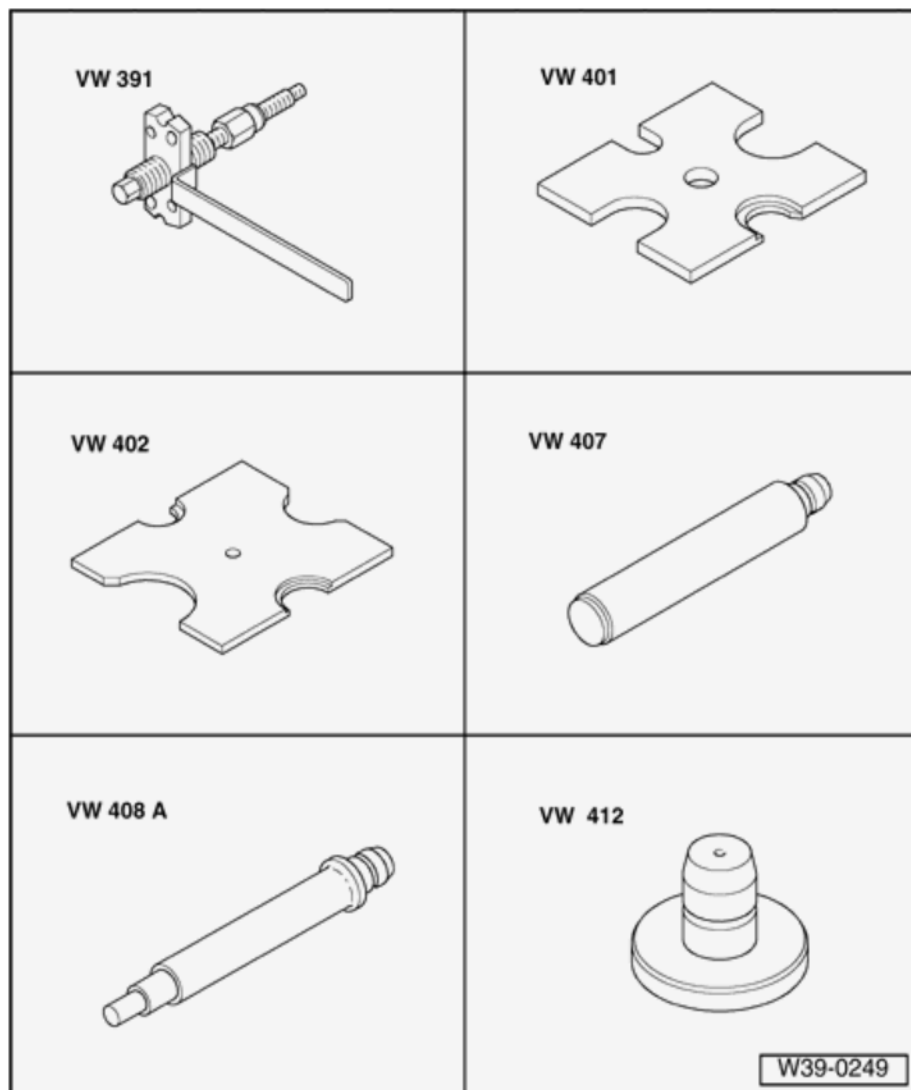


Fig. 89: Identifying Special Tools - Drive Pinion, Removing And Installing And Disassembling And Assembling (1 Of 4)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools and workshop equipment required

- VW 391 Puller
- VW 401 Thrust plate
- VW 402 Thrust plate
- VW 407 Punch
- VW 408 A Punch
- VW 412 Thrust disc

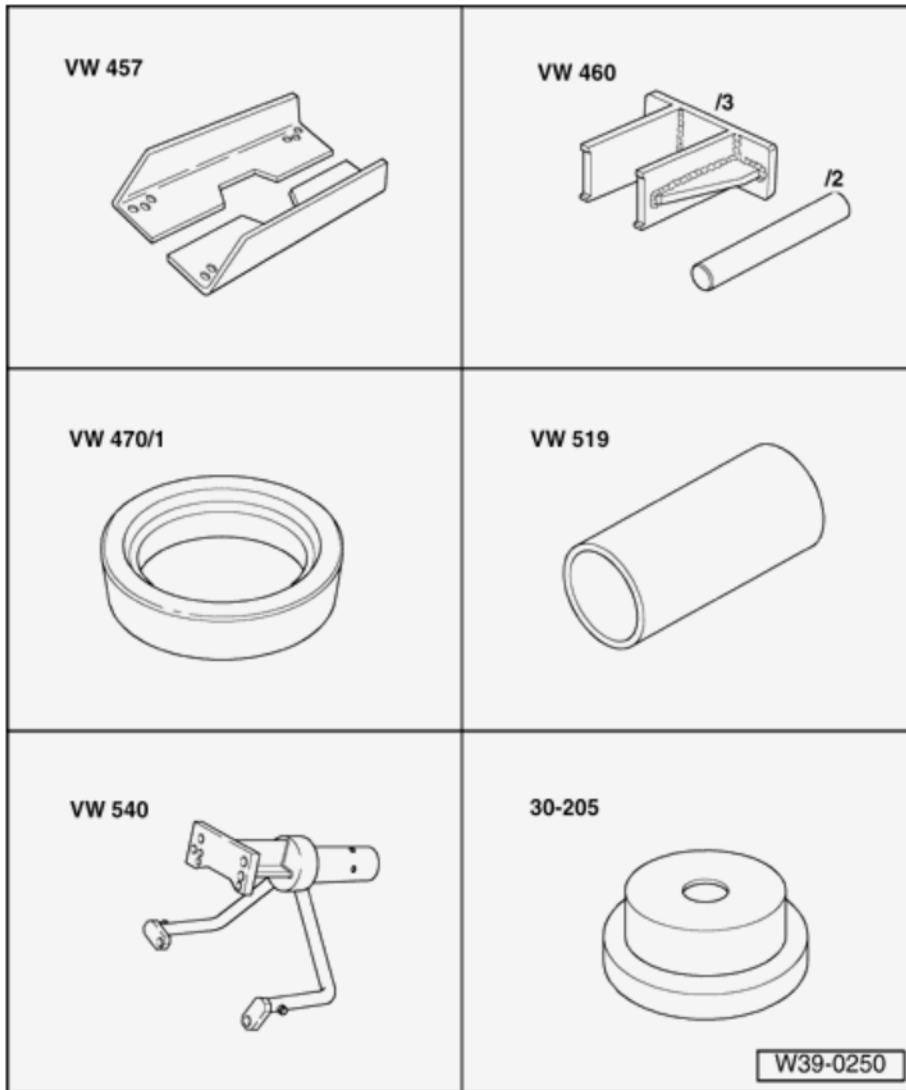


Fig. 90: Identifying Special Tools - Drive Pinion, Removing And Installing And Disassembling And Assembling (2 Of 4)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools and workshop equipment required

- VW 457 Supporting channels
- VW 460 Removal device
- VW 470/1 Assembly ring
- VW 519 Sleeve
- VW 540 Holding fixture
- 30-205 Thrust pad

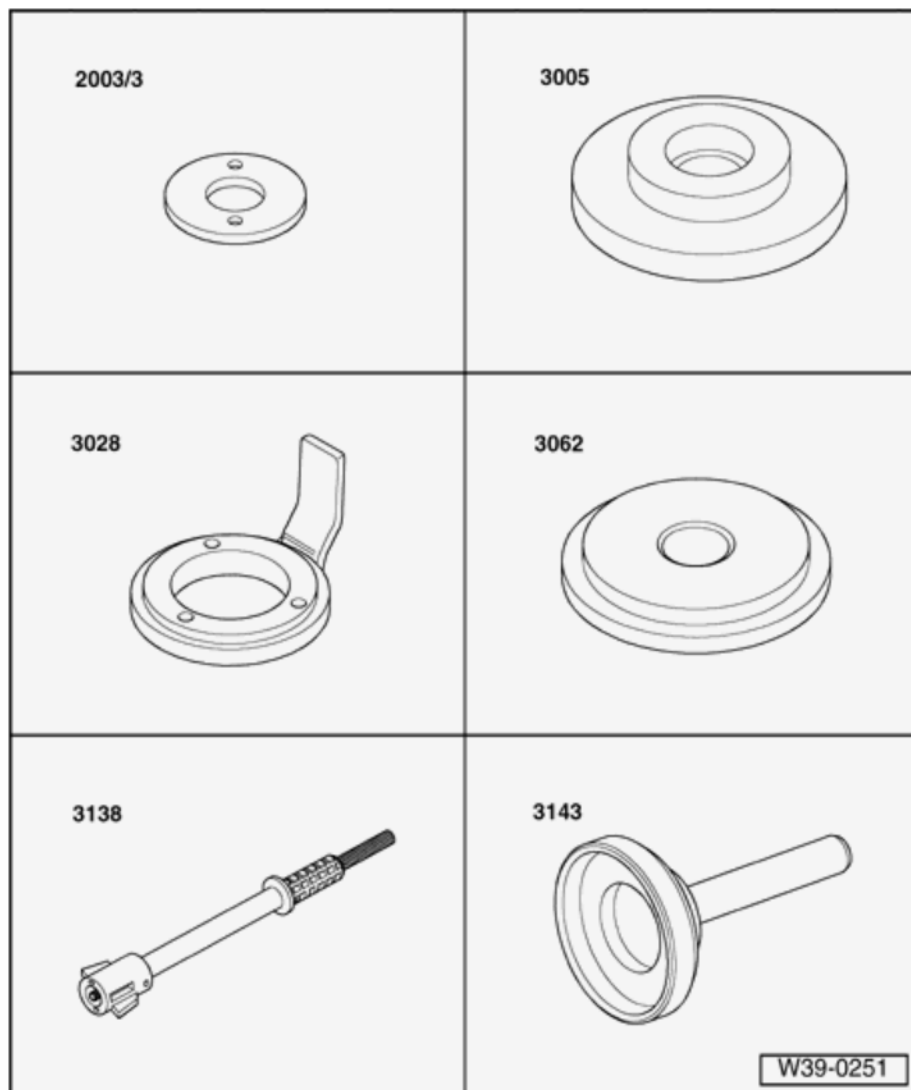


Fig. 91: Identifying Special Tools - Drive Pinion, Removing And Installing And Disassembling And Assembling (3 Of 4)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools and workshop equipment required

- 2003/3 Inserter ring
- 3005 Thrust pad
- 3028 Retainer
- 3062 Thrust pad
- 3138 Drift
- 3143 Seal driver-Frt wheel bearing

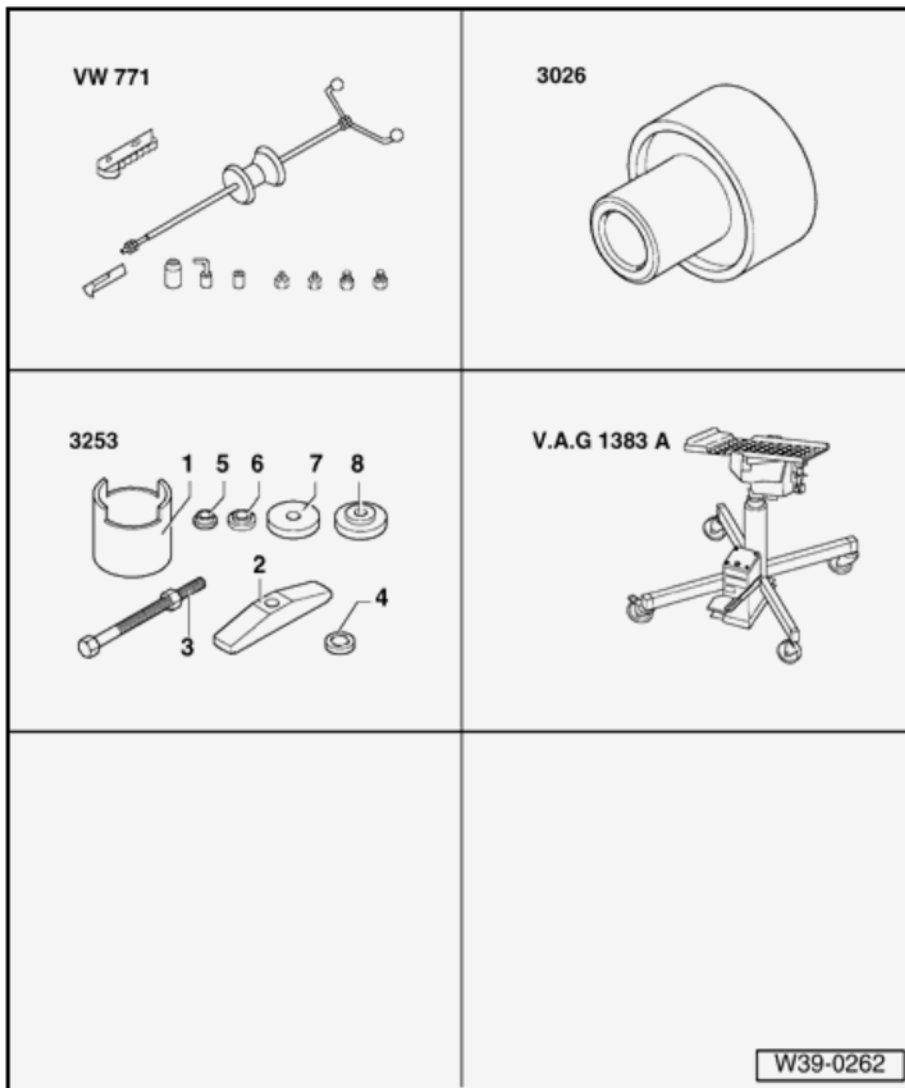


Fig. 92: Identifying Special Tools - Drive Pinion, Removing And Installing And Disassembling And Assembling (4 Of 4)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools and workshop equipment required

- VW 771 Slide hammer-complete set
- 3026 Mandrel
- 3253 Wheel bearing assembly set
- V.A.G 1383 A Engine/transmission jack

NOTE:

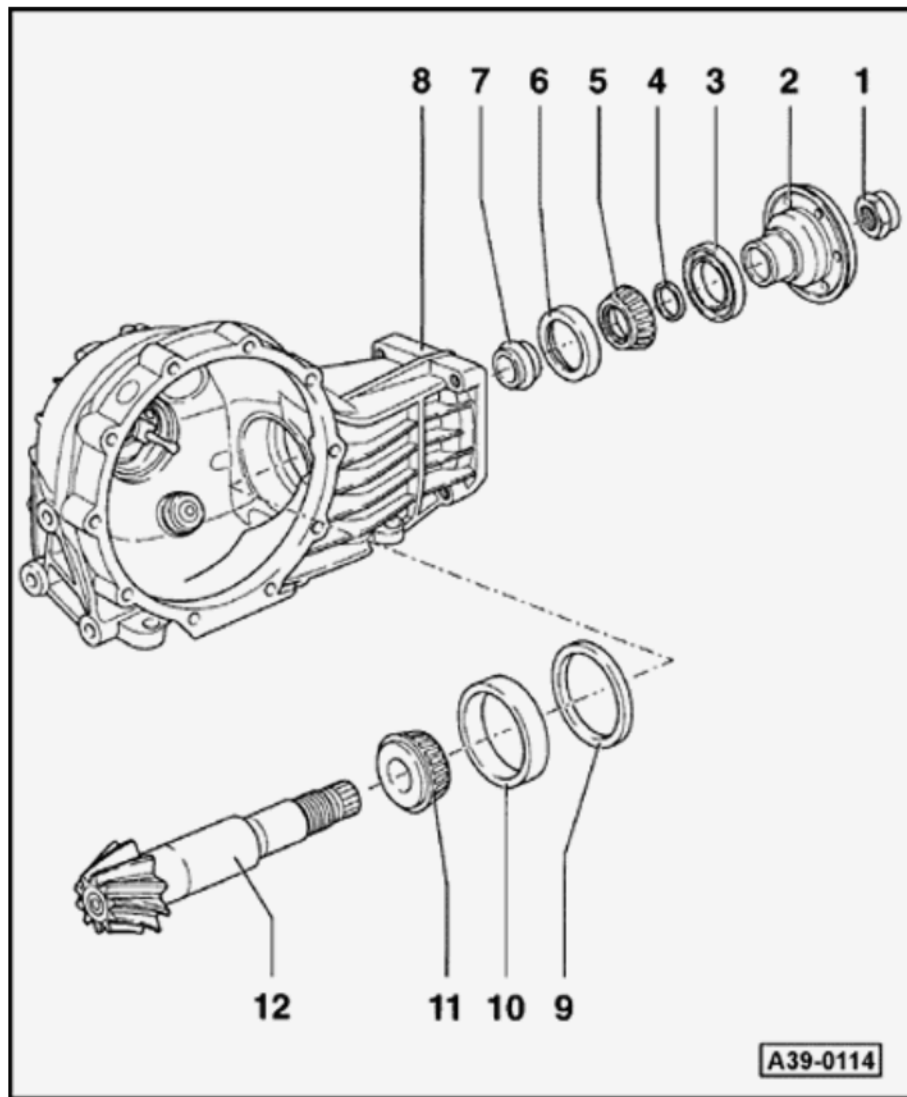


Fig. 93: Exploded View Of Drive Pinion Assembly
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace both taper roller bearings together.
- Install new taper roller bearings in delivery condition and do not oil additionally.
- When replacing the parts marked with 1) adjustment work is required. Refer to Adjustment overview.

1 - Nut

- Unscrewing. See Fig. 94
- Screwing in. See Fig. 108
- Measuring friction torque. See Fig. 109
- Securing. See Fig. 110

2 - Flange for drive shaft

- Pulling off. See [Fig. 95](#)
- Installing. See [Fig. 107](#)

3 - Sealing ring

- Pulling out. See [Fig. 96](#)
- Tapping in. See [Fig. 106](#)

4 - O-ring

- Replace
- Insert with gear oil. See [Fig. 105](#)

5 - Inner race for small taper roller bearing 1)

- Pressing out drive pinion. See [Fig. 97](#)
- Pressing on. See [Fig. 104](#)

6 - Outer race for small taper roller bearing 1)

- Pulling out. See [Fig. 98](#)
- Pressing in. See [Fig. 103](#)

7 - Spacer sleeve 1)

- Replace

8 - Final drive housing 1)**9 - Shim "S3"**

- Note thickness
- Adjustment overview. Refer to [Adjustment overview](#).

10 - Outer race for large taper roller bearing 1)

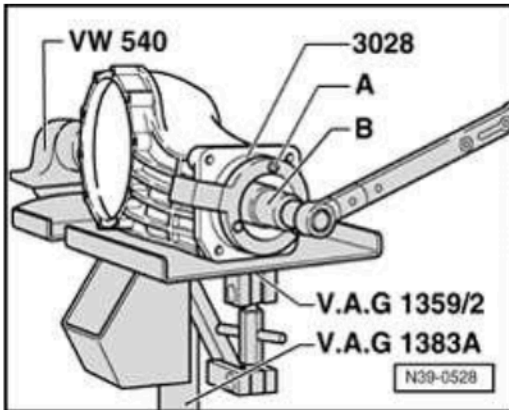
- Tapping out. See [Fig. 99](#)
- Inserting. See [Fig. 102](#)

11 - Inner race for large taper roller bearing 1)

- Pressing off. See [Fig. 100](#)
- Pressing on. See [Fig. 101](#)

12 - Drive pinion 1)

- Is mated with ring gear, replace together as a set

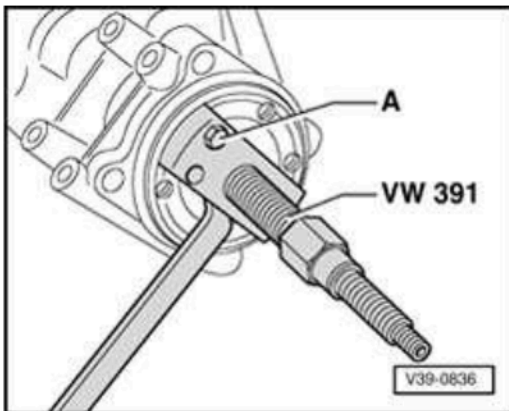
Removing nut for drive pinion**Fig. 94: Removing/Installing Nut For Pinion**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure final drive on a repair stand. Refer to Secure complete rear final drive on a repair stand with bracket VW 540.
- Screw in two hexagon nuts M8 x 30 -A-.

B - Socket, long A/F 36

- When nut is loosened the final drive must be supported (e.g. with universal transmission mounting 1359/2 in conjunction with engine/transmission jack V.A.G 1383 A).

Pulling flange for drive shaft off drive pinion**Fig. 95: Pull Off Flange Using Puller VW 391**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw two hex nuts M8 x 30 -A- into the flange.

Pulling out seal for flange for drive shaft

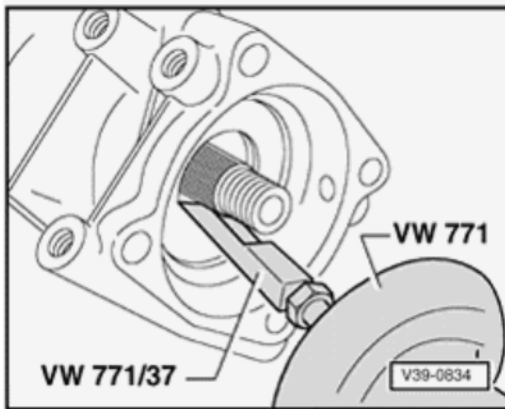


Fig. 96: Pulling Out Sealing Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Pressing drive pinion out of inner race for small taper roller bearing

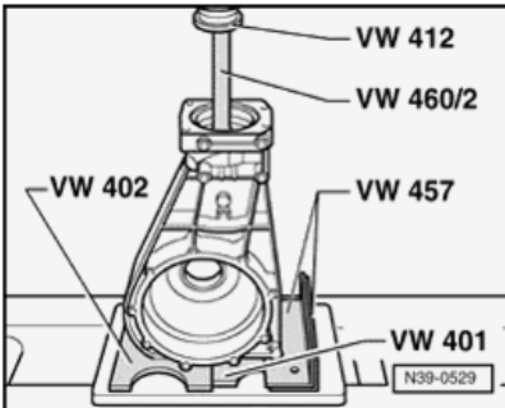


Fig. 97: Pressing Off Drive Pinion From Inner Race/Tapered Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Pulling out small taper roller bearing outer race

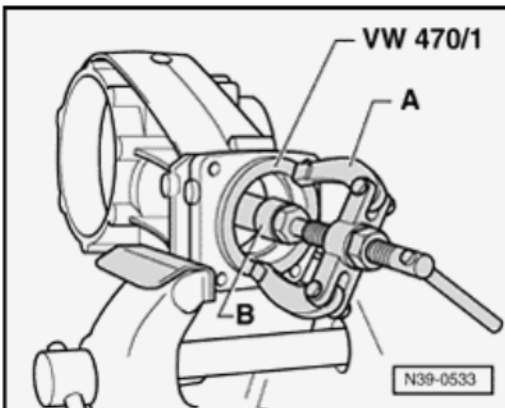


Fig. 98: Pulling Off Small Outer Race/Tapered Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

B - Support, e.g. Kukko 22/2

B - Internal puller 46 to 2.28 in, e.g. Kukko 21/7

Driving out outer race for large taper roller bearing

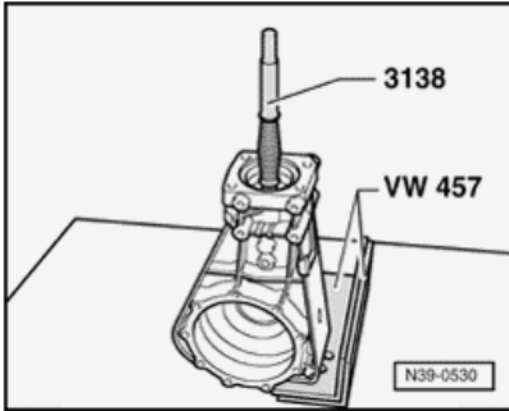


Fig. 99: Driving Out Large Outer Race/Tapered Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- After removing check shims for damage.

Pressing inner race for large taper roller bearing off drive pinion

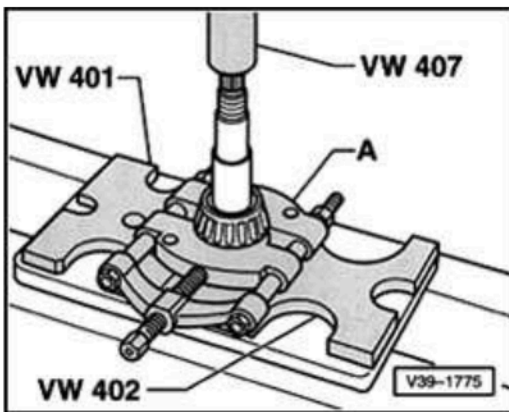


Fig. 100: Pressing Off Inner Race Of Large Taper Roller Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Separating device 22 to 4.53 in, e.g. Kukko 17/2

Pressing inner race for large taper roller bearing onto drive pinion

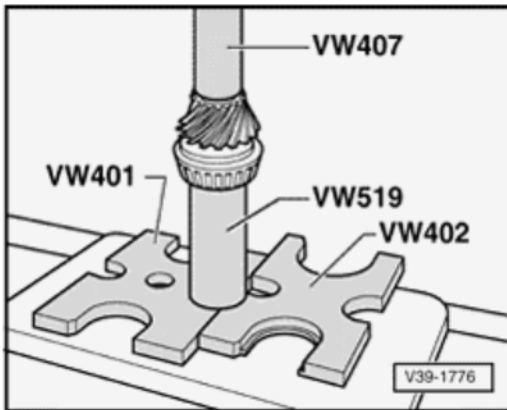


Fig. 101: Pressing On Inner Race Of Large Taper Roller Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Heat inner race to approx. 100°C, position and push to final position.

WARNING: WARNING!

Wear protective gloves!

Pulling in outer race for large taper roller bearing

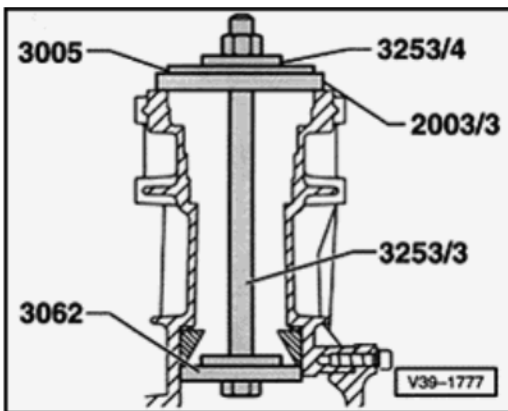


Fig. 102: Pulling In Large Outer Race/Tapered Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lightly lubricate bearing seat in housing.
- Insert predetermined shim "S3" for drive pinion. Refer to [Adjustment overview](#).

The inscription "top" on pressure plate 3253/4 faces nut of insertion device

Pressing in small taper roller bearing outer race

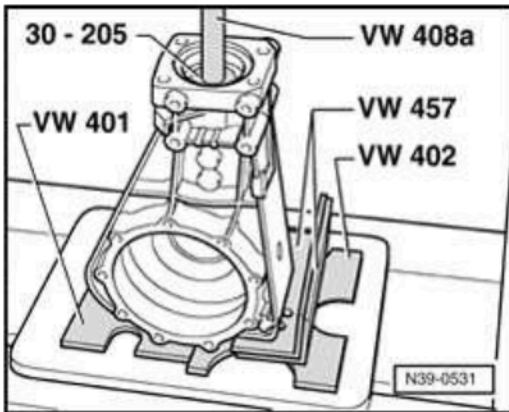


Fig. 103: Pressing In Small Outer Race/Tapered Bearing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lightly lubricate the bearing seat in the housing.
- The outer race must be attached with needle bearing drift VW 295 and thrust pad 30-205.

Pressing on small taper roller bearing inner race

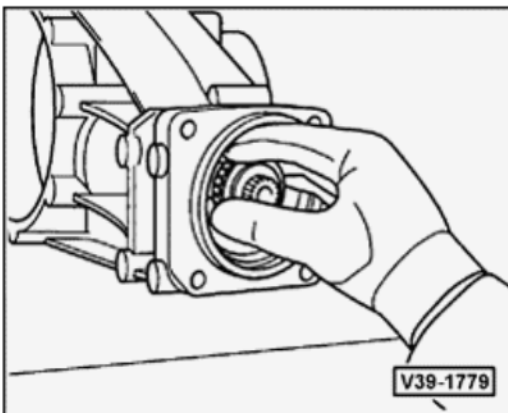


Fig. 104: Installing Small Taper Roller Bearing Inner Race
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert new drive pinion with a new spacer sleeve.

WARNING: WARNING!

Wear protective gloves!

- Heat inner race for small taper roller bearing to approx. 100°C and install onto drive pinion.
- Press up drive pinion and insert bearing with sleeve 40-21 onto stop.

Inserting O-ring

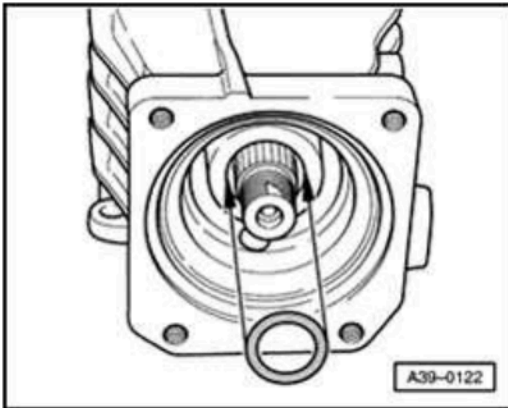


Fig. 105: Inserting O-Ring

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert O-ring with gear oil.

Tapping in seal for flange for drive shaft

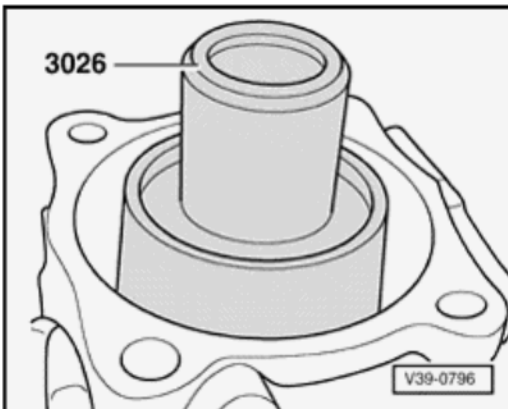


Fig. 106: Driving In Seal For Driveshaft Flange

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lightly oil outer circumference of seal.
- Drive in seal onto stop with Mandrel 3026.
- Pack space between sealing and dust lips half-full with sealing grease G 052 128 A1.

Installing flange

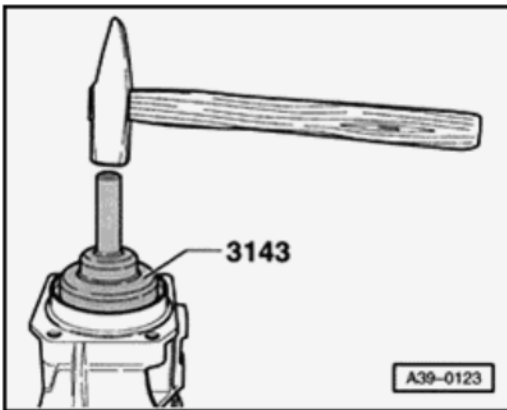


Fig. 107: Driving Drive Shaft Flange Onto Drive Pinion
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive shaft flange onto drive pinion until securing nut can be mounted.

Tighten nut for drive pinion and adjusting friction torque

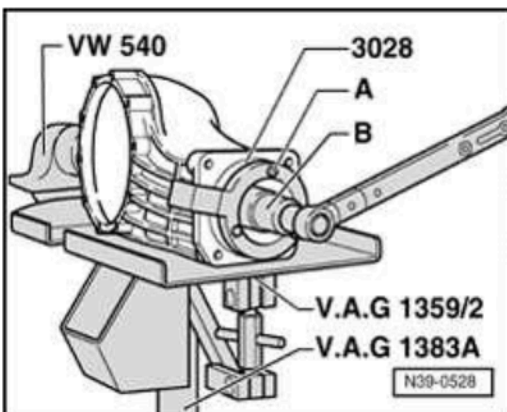


Fig. 108: Removing/Installing Nut For Pinion
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

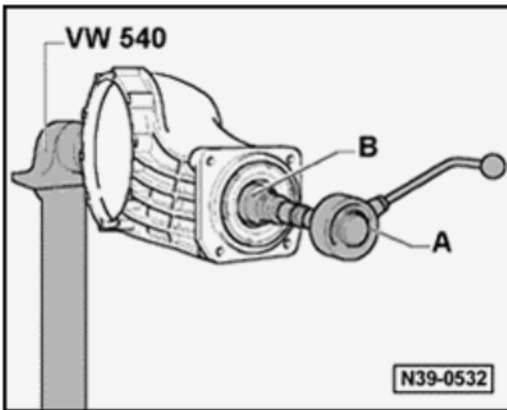
- Screw in two hex nuts M8 x 30 -A-.

B - Socket, long A/F 36

- When the nut is tightened the final drive must be supported (e.g. with universal transmission mounting 1359/2 in conjunction with engine/transmission jack V.A.G 1383 A).

NOTE: Only increase tightening torque slowly and read-off frictional torque frequently. If the specified frictional torque is exceeded, the spacer sleeve must be replaced and the adjustment repeated. It is not possible to re-use a spacer sleeve that has been excessively compressed.

Measuring frictional torque

**Fig. 109: Measuring Friction Torque**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE: Do not lubricate new taper roller bearings for frictional torque measurement. The bearings have already been treated with special oil by the manufacturer.

With torque gauge, 0 to 600 Ncm, standard commercially available

B - Socket, A/F 36

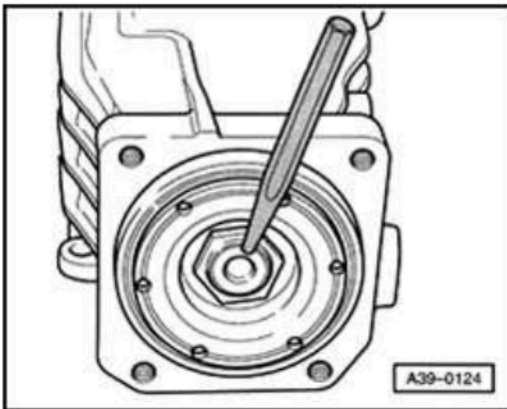
NOTE: Use 3/4" to 1/2" reducer as necessary.

The following frictional torques should be set:

New bearings	Used bearings 1)
200 to 250 Ncm	30 to 60 Ncm

1) With at least 50 km service

Removing nut for drive pinion

**Fig. 110: Locking Drive Pinion Hexagon Nut**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- When the nut has been locked the radial run-out on the drive shaft flange should be measured. Refer to **Drive shaft flange, measuring and marking radial run-out.**

DRIVE PINION AND RING GEAR, ADJUSTING

Drive pinion and ring gear, adjusting

NOTE:

- Careful adjustment of the drive pinion and ring gear is important for the service life and smooth running of the final drive. For this reason, the drive pinion and ring gear are matched together during manufacture, and checked to ensure a good mesh pattern and quiet running in both directions of rotation. The position of quietest running is found by moving the drive pinion in an axial direction and at the same time lifting the ring gear out of the zero-play mesh position by the amount necessary to maintain the backlash within the specified tolerance.
- The object of the adjustment is to reproduce the setting for quietest possible running, as obtained on the test machine in production.
- The deviation "r", which is related to the master gauge "Ro" is measured for the final drive sets supplied as replacement parts and marked on the outer circumference of the ring gear. The final drive set (drive pinion and ring gear) must only be replaced together as a matched pair.
- Observe the general repair instructions for taper roller bearings and shims.
- Maximum care and cleanliness are essential for achieving good results when performing repairs and taking measurements.

Gear sets, adjusting and marking

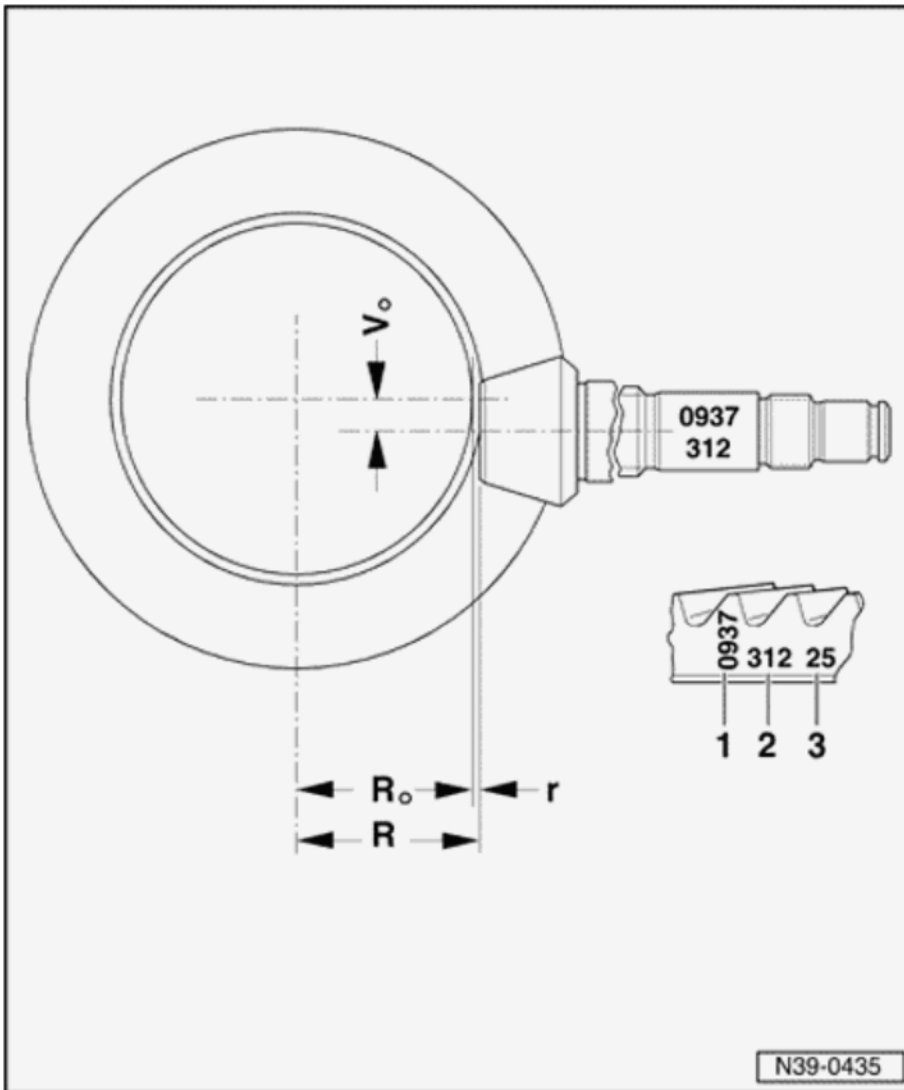


Fig. 111: Identifying Gear Set Markings And Adjustment Dimensions
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Marking "0937" indicates Oerlikon final drive set with transmission ratio 37 : 9.

NOTE: Klingelberg final drives "K937" or Gleasen final drives "G937" can be installed.

2 - Gear set pairing number (312).

3 - Deviation (tolerance) "r" is based on the test machine master gauge used in production. The deviation "r" is always given in 1/100 mm. Example: "25" means $r = 0.25$ mm

Ro - Length of adjustment master "Ro" of tester used.

Ro - Ring gear = 57.50 mm

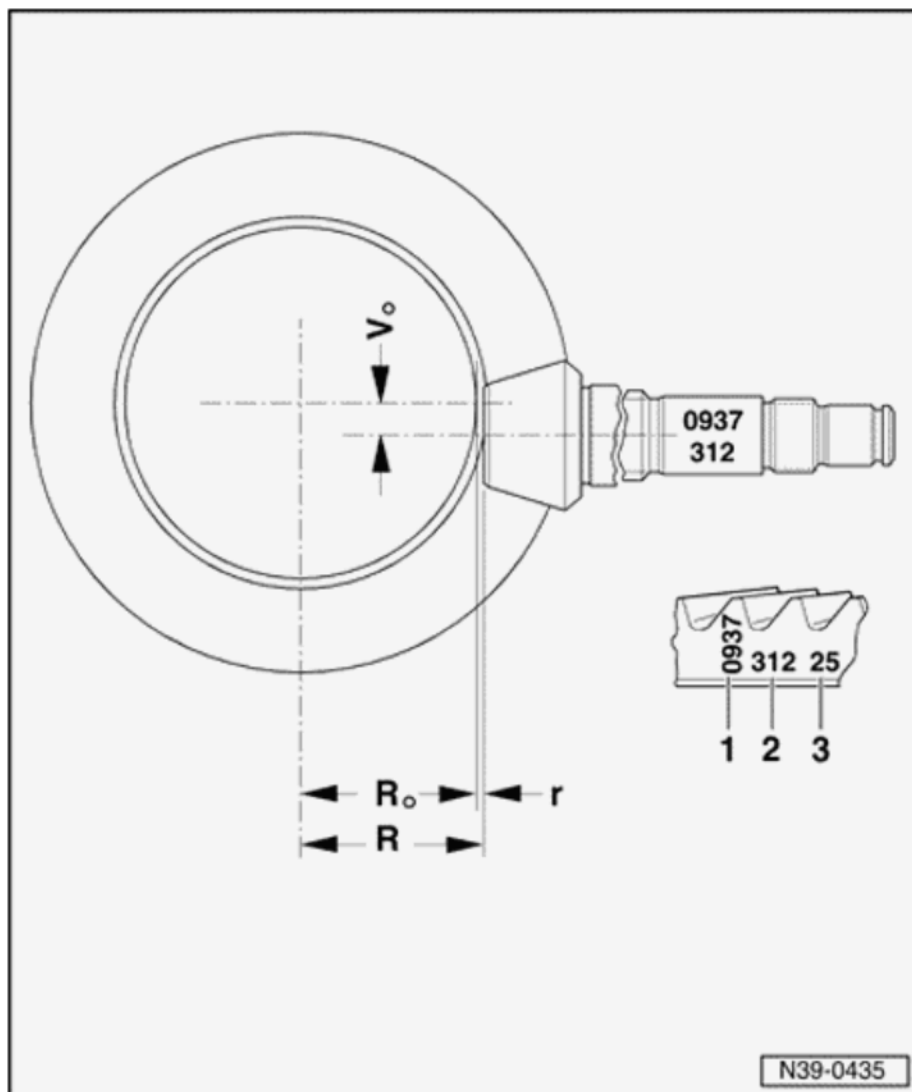


Fig. 112: Identifying Gear Set Markings And Adjustment Dimensions
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

R - Actual dimension between ring gear and face of pinion shaft at point with quietest running for this gear set. $R = R_o + r$

V_o - Hypoid offset

Position of shims

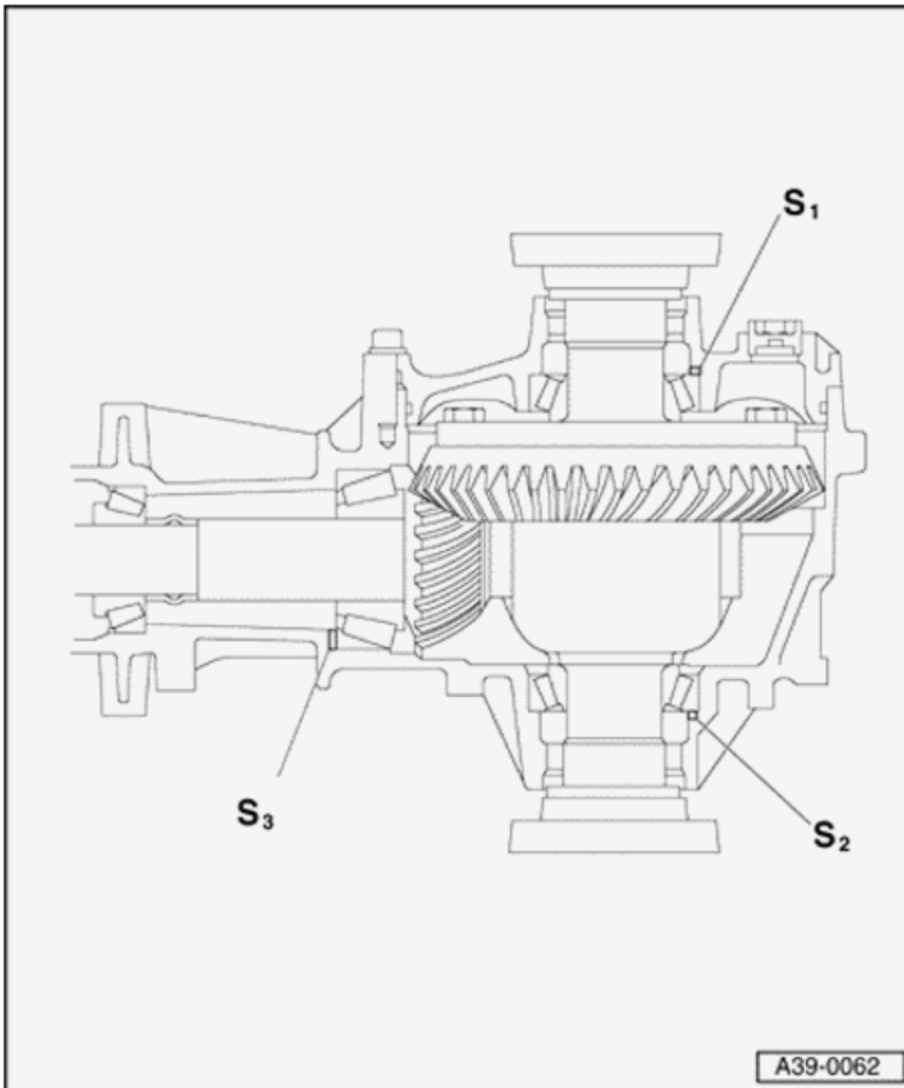


Fig. 113: Identifying Differential Adjustment Shim Positions

Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE: Adjustment overview when Replacing individual components of transmission.
Refer to Adjustment overview.

S1 - Adjustment shim for ring gear in cover for final drive

S2 - Shim for ring gear in final drive housing

S3 - Shim for drive pinion in final drive housing

Adjustment overview

NOTE: If performing assembly work on the final drive it is only necessary to adjust the drive pinion or final drive set if components have been replaced which have a

direct effect on the adjustments of the final drive. To eliminate unnecessary adjustments observe following table:

Parts replaced: ?	To adjust:		
	Ring gear "S1"+"S2" 1) Refer to <u>Ring gear,</u> <u>adjusting</u>	Pinion shaft "S3" 1) Using deviation "r" Refer to <u>Drive pinion,</u> <u>adjusting</u>	Backlash Testing Refer to <u>Adjusting</u> <u>backlash</u>
Final drive housing	X	X	X
Differential housing	X		X
Taper roller bearings for pinion shaft		X	X
Taper roller bearing for differential	X		X
Final drive set 2)	X	X	X
Final drive cover	X		X

1) Shims; installation position. Refer to **Position of shims.**

2) Drive pinion and ring gear; only replace together.

Final drive, readjustment sequence

The following procedure is recommended to save time when the drive pinion and ring gear have to be adjusted:

1.)	Determine total shim thickness "Stotal" for "S1" + "S2" for the specified preload for taper roller bearings for differential.
2.)	Determine total shim thickness "S3" to reproduce the installation position for the drive pinion determined on the test machine in production.
3.)	Distribute total shim thickness "Stotal" for "S1" + "S2" so that the specified backlash exists between ring gear and drive pinion.

NOTE: Overview of components and shims. Refer to **Position of shims.**

Drive pinion, adjusting

Special tools and workshop equipment required

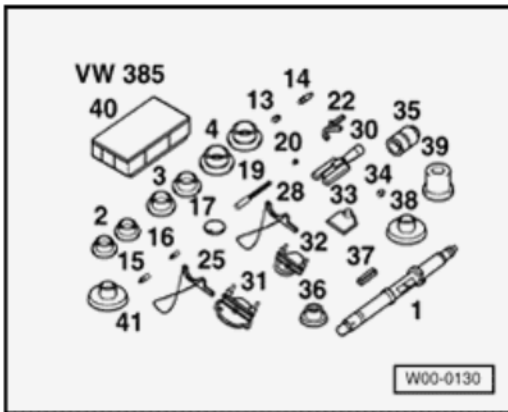


Fig. 114: Universal Measuring Device VW 385

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VW 385 Universal measuring tool

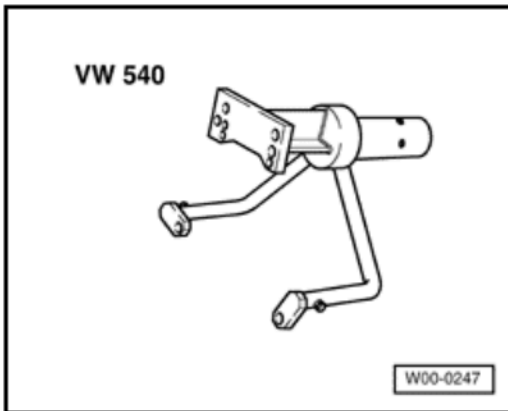


Fig. 115: Holding Fixture VW 540

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VW 540 Engine and transmission support

NOTE:

- Before adjusting the drive pinion adjust the ring gear (ascertain total shim thickness "S" for shims "S1" + "S2"). Refer to Ring gear, adjusting.
- Re-adjustment of the drive pinion is only necessary if the final drive set, taper roller bearing for drive pinion or housing for final drive is replaced. Adjustments. Refer to Adjustment overview.
- Do not oil new taper roller bearings for frictional torque measurement. The bearings have already been treated with special oil by the manufacturer.

Determining shim "S3" thickness

(Setting preload of taper roller bearing for drive pinion)

- Clamp final drive into assembly bracket. Refer to **Rear final drive, attaching to assembly bracket**.

- Insert both outer races for the taper roller bearing without shims into the housing. Refer to **Fig. 102** and **Fig. 103**

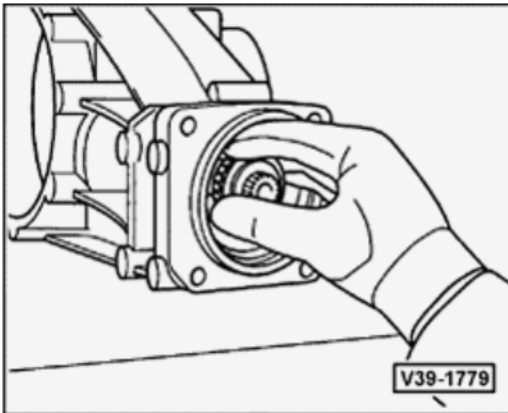


Fig. 116: Installing Small Taper Roller Bearing Inner Race
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert drive pinion without spacer sleeve.
- Heat inner race for taper roller bearing to approx. 100°C and install onto drive pinion.

WARNING: WARNING!

Wear protective gloves!

NOTE:

- Only install spacer sleeve for final frictional torque measurement (after determining shim "S3").
 - Install new taper roller bearings in delivery condition and do not oil.
- Mount flanges for drive shaft and tighten hex nut for the flange. Refer to **Fig. 107**

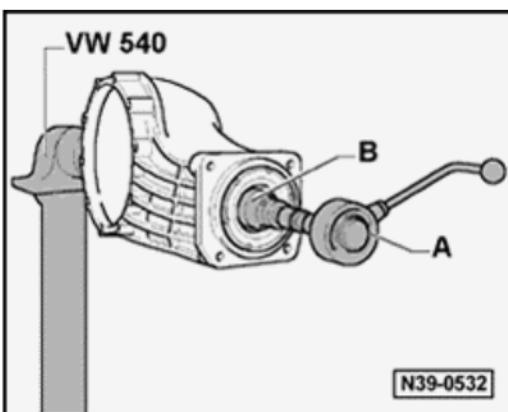


Fig. 117: Measuring Friction Torque
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Torque gauge, commercially available, 0 to 600 Ncm

B - Socket, A/F 36

- Tighten drive pinion nut until the following frictional torque is obtained.

New bearings	Used bearings 1)
200 to 250 Ncm	30 to 60 Ncm

1) With at least 50 km service

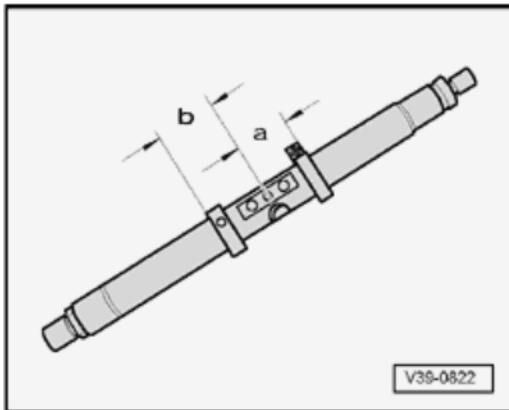


Fig. 118: Setting Adjusting Rings Of Measuring Bar VW 385/1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Set adjustment ring of universal mandrel VW 385/1.
- Distance a = 60 mm
- Set sliding adjustment ring.
- Distance b = 55 mm

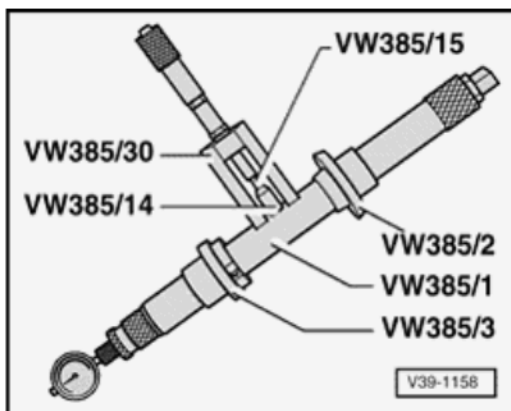


Fig. 119: Assemble Measuring Bar According

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Assemble universal mandrel as illustrated.
- Dial indicator extension VW 385/15 = 9 mm long
- Set universal master gauge VW 385/30.
- $R_o = 57.50$ mm
- Set dial indicator (3 mm measuring range) to "0" with 2 mm preload.
- Turn drive pinion 8 turns in both directions so that the taper roller bearings settle.

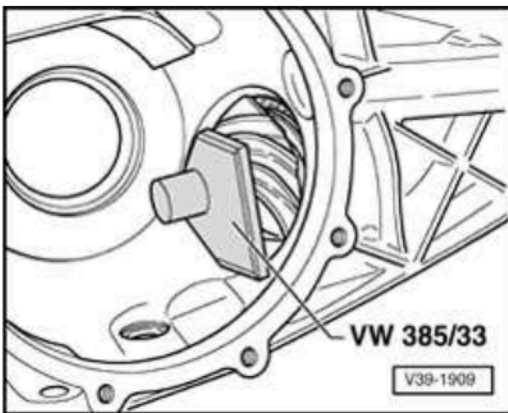


Fig. 120: Placing Magnetic Plate Onto Drive Pinion Face
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place end measuring plate VW 385/33 onto drive pinion head.

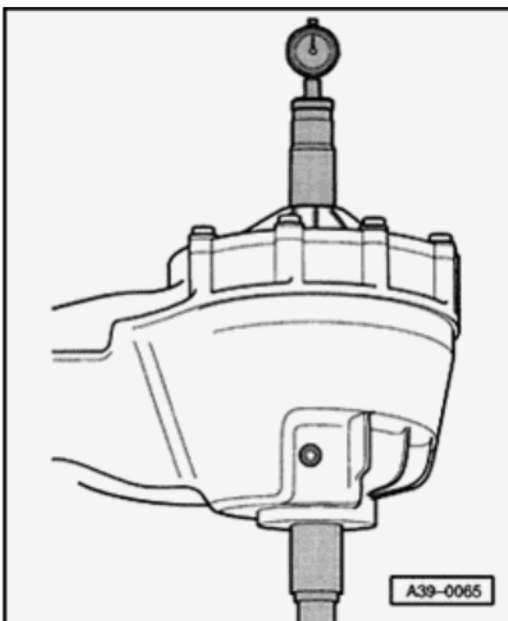


Fig. 121: Insert Measuring Mandrel In The Housing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove master gauge and insert measuring mandrel in the housing.
- The centering disc for VW 385/3 faces toward cover for final drive
- Install cover for final drive and tighten 4 bolts.
- Using adjustable ring, move 2nd centering disc out as far as possible so that the mandrel can still just be turned by hand.

Determining measurement "e"

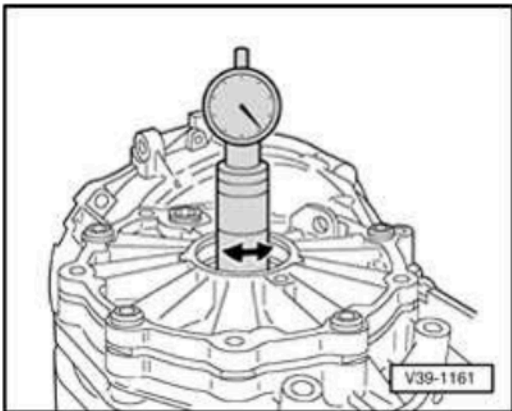


Fig. 122: Insert Universal Mandrel And Perform Check Measurement
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn mandrel until the dial indicator point touches the end measuring plate on pinion shaft head, then measure maximum deflection (return point). The measured value is dimension "e" (in red range).
- Measurement in following example: "e" = 1.60 mm

NOTE: Dimension "e" is required to determine thickness of shim "S3".

- Then, (after removing universal mandrel) check again that the dial indicator, with master gauge VW 385/30 installed, indicates "0" with 2 mm preload, otherwise repeat the measurement.

Determining shim thickness "S3"

Formula:		
"S3"	=	"e" - "r"
e	=	Determined value
r	=	Deviation (marked on ring gear in 1 /100 mm)

2005 Audi A4 Quattro**REAR DIFFERENTIAL Rear Final Drive****Example:**

	Determined value "e"	1.60 mm
-	Deviation "r"	0.42 mm
=	Thickness of shim "S3"	1.18 mm

- Determine shim(s) as accurately as possible from table. Part numbers

The following shims are available for "S3"

Shim thickness (mm) 1)		
0.95	1.20	1.45
1.00	1.25	1.50
1.05	1.30	1.55
1.10	1.35	
1.15	1.40	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

- Remove universal mandrel.
- Remove drive pinion and outer race for large taper roller bearing and reinstall with calibrated shims "S3" and spacer sleeves. Refer to **Fig. 94**.
- Insert inner race for small taper roller bearing and tighten drive pinion nut until specified frictional torque is achieved. Refer to **Fig. 108**.

NOTE:

- **Do not oil new taper roller bearings for frictional torque measurement. The bearings have already been treated with special oil by the manufacturer.**
- **Only increase tightening torque slowly and read-off frictional torque frequently. If the specified frictional torque is exceeded, the spacer sleeve must be replaced and the adjustment repeated. It is not possible to re-use a spacer sleeve that has been excessively compressed.**

- Set to following frictional torques:

New bearings	Used bearings 1)
200 to 250 Ncm	30 to 60 Ncm

1) With at least 50 km service

Performing check measurement**Checking dimension "r"**

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- Turn drive pinion 8 turns in both directions so that the taper roller bearings settle.

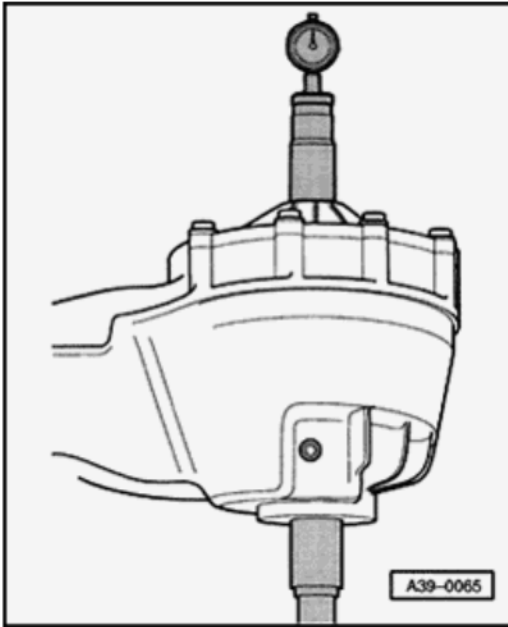


Fig. 123: Insert Measuring Mandrel In The Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert universal mandrel and check measurement.
- If the shims have been correctly selected, the dial indicator, reading counter clockwise (in red range), will show deviation "r" within a tolerance of ± 0.05 mm
- Peen drive pinion nut with a punch.
- The radial run-out at flange for drive shaft must always be measured and marked. Refer to **Drive shaft flange, measuring and marking radial run-out.**

Ring gear, adjusting

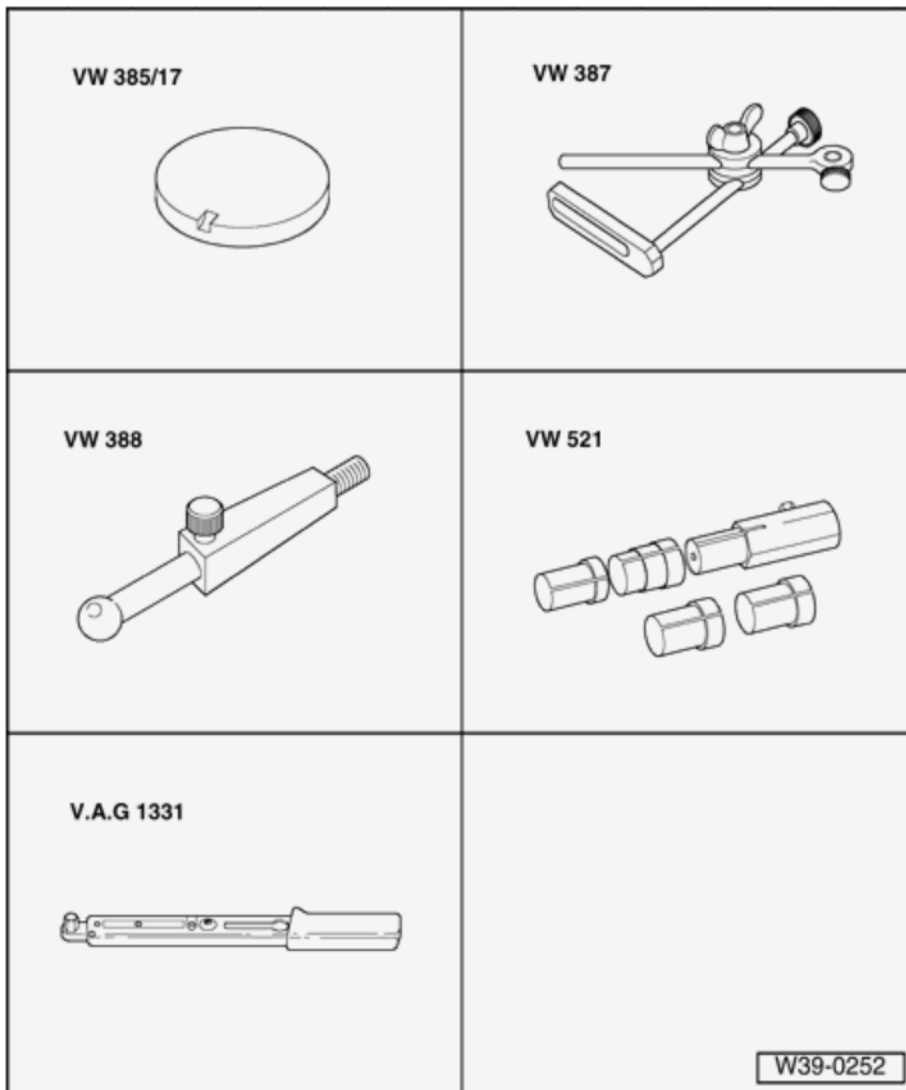


Fig. 124: Identifying Special Tools - Ring Gear, Adjusting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

(Adjusting differential)

Special tools and workshop equipment required

- VW 385/17 Magnetic plate 50 mm dia.
- VW 387 Dial gauge holder
- VW 388 Measuring lever
- VW 521 Adjustment tool for ring gear
- V.A.G 1331 Torque wrench

It is necessary to readjust the ring gear when:

Final drive housing, cover for final drive, taper roller bearing for differential, differential housing or drive pinion are replaced.

Adjustment overview. Refer to [Adjustment overview](#)

NOTE:

- **Differential taper roller bearings are low friction bearings. Therefore the frictional torque only has a limited use as a check. Correct adjustment is only possible by determining the total shim thickness "Stotal".**
- **Do not oil new taper roller bearings for frictional torque measurement. The bearings have already been treated with special oil by the manufacturer.**

Determining total shim thickness "Stotal" for shims "S1" + "S2"

(Setting preload of taper roller bearing for differential)

- Drive pinion is removed!

NOTE:

If only the taper roller bearings for the differential are being replaced, the ring gear can be removed from the differential housing. The pinion shaft does not need to be removed.

- Pry out seals for flange shaft using a suitable lever.
- Remove outer races of differential taper roller bearings and remove shims. Refer to [Differential, disassembling and assembling](#)
- Drive outer race/taper roller bearing for left differential (housing side) with shim "S2*" of thickness 1.00 mm into housing. Refer to [Differential, disassembling and assembling](#).

NOTE:

For measurement purposes a shim "S2" with a thickness of 0.04 in is initially inserted. It is referred to as "S2*" in the following. After determining the backlash "S2*" will be replaced by the correct "S2".

- Drive outer race/taper roller bearing for right differential (cover side) without shim in onto stop. Refer to [Differential, disassembling and assembling](#).
- Insert differential into housing. The ring gear is positioned on the right side (cover side).
- Install cover and tighten bolts to 25 Nm.

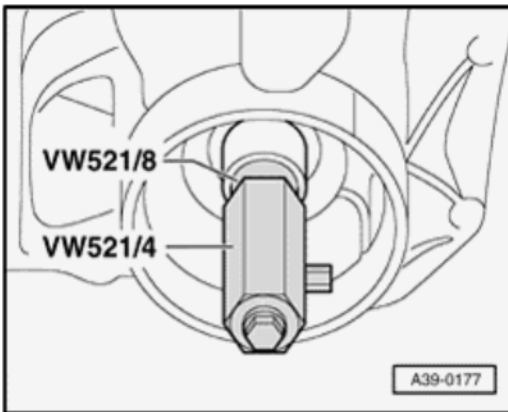


Fig. 125: Installing Special Tools VW 521/4 And 521/8 Onto Housing Side In Differential Housing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install special tools VW 521/4 and 521/8 onto housing side in differential housing.
- Turn cover side of differential housing upward.
- Turn differential 8 turns in both directions so that the taper roller bearings settle.
- Place measuring plate VW 385/17 onto differential.

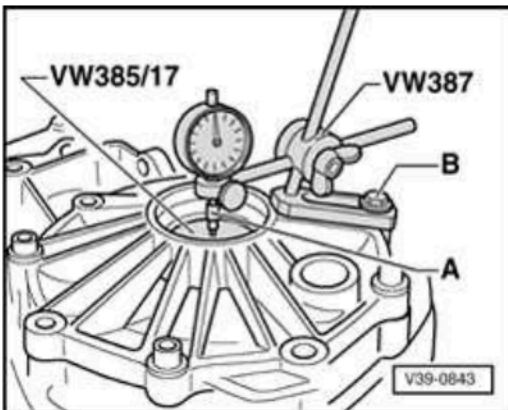


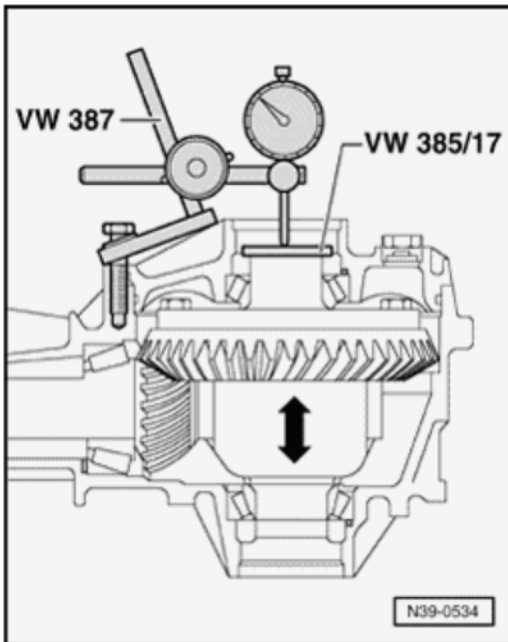
Fig. 126: Installing Measuring Tools
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install measuring tools.

A - Dial indicator extension approx. 30 mm long

B - Hex bolt M8 x 45

- Position dial indicator extension in middle of measuring plate VW 385/17.
- Set dial indicator (3 mm measuring range) to "0" with 2 mm preload.

**Fig. 127: Read Play On Dial Gauge**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lift differential without turning; read off play on dial indicator and write it down.
- Measurement in following example: 0.50 mm
- If you want to repeat the measurement differential 8 turns in both directions so that the taper roller bearings settle.

Determine "Stotal" ($S1 + S2$)**Formula:**

"Stotal"	=	"S2*" + measurement + bearing preload
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Example:

	Inserted shim(s) "S2*"	1.00 mm
+	Measurement	0.50 mm
+	Bearing preload (constant)	0.30 mm
=	Total shim thickness "Stotal" for shims "S1" + "S2"	1.80 mm

Determining thickness of shim "S1*"

NOTE:

- The preliminary adjustment shim "S1*" will be replaced with the final shim "S1" after determining the backlash.
- The total shim thickness "Stotal" remains the same.

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REAR DIFFERENTIAL Rear Final Drive

Formula:

$$"S1*" = "Stotal" - "S2*"$$

Example:

	Total shim thickness "Stotal" for shims "S1" + "S2"	1.80 mm
-	Inserted shim(s) "S2*"	1.00 mm
=	Thickness of shim "S1*"	0.80 mm

- Define shim(s) as precisely as possible based on the table. Refer to **The following shims are available for "S1"**.

Measuring frictional torque (check)

- Pinion shaft removed
- Differential installed with shims "S1*" and "S2*"

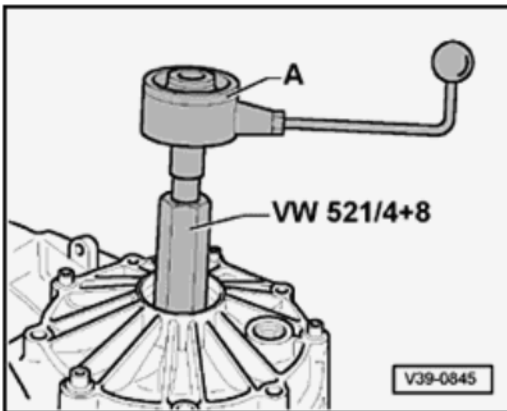


Fig. 128: Measuring Differential Frictional Torque
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install torque gauge 0 to 600 Ncm -A- onto differential.
- Read off friction torque.

Frictional torque specified values:

New bearings	Used bearings 1)
150 to 300 Ncm	30 to 60 Ncm

1) With at least 50 km service

NOTE:

- Differential taper roller bearings are low friction bearings. Therefore the frictional torque only has a limited use as a check. Correct adjustment is only possible by determining the total shim thickness "Stotal".

- Do not oil new taper roller bearings for frictional torque measurement. The bearings have already been treated with special oil by the manufacturer.
- If the final drive set is being re-adjusted, the adjustment of the pinion shaft should be performed now, and the adjustment should be checked. Refer to Drive pinion, adjusting.

Adjusting backlash

- Drive pinion with shim "S3" installed
- Differential with shims "S1*" + "S2*" installed
- Insert differential into final housing mount cover and tighten all bolts to 25 Nm.
- Turn differential 5 turns in both directions so that the taper roller bearings settle.

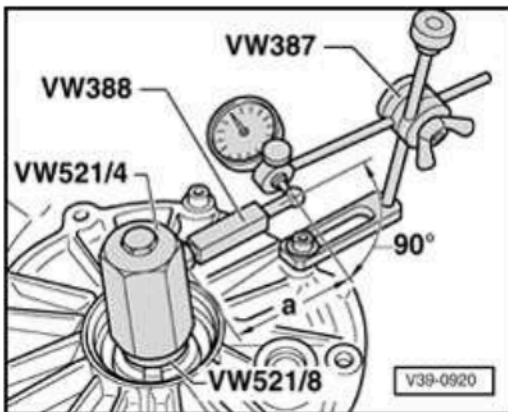


Fig. 129: Installing Measuring Tools

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install measuring tools.
- Use dial indicator extension VW 382/10 (6 mm flat).
- Set measuring lever VW 388 to dimension "a" = 60 mm.
- Measure play between teeth flanks (backlash) as follows:
 - Turn ring gear until it makes contact with a tooth flank (end of backlash travel).
 - Preload dial indicator to 1 mm and set to zero.
 - Turn ring gear back until lying against an opposite tooth flank (backlash).
 - Read off backlash and note value.
- Turn ring gear through 90° and repeat measurements a further 3 times.

Determining average backlash

Example:

1:10:55 AM	Page 88	

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REAR DIFFERENTIAL Rear Final Drive

	1st Measurement	0.28 mm
+	2nd Measurement	0.30 mm
+	3rd Measurement	0.30 mm
+	4th Measurement	0.28 mm
=	Sum of measured values	1.16 mm

- Result: The average backlash is 1.16 divided by 4 = 0.29 mm

NOTE: If the individual measurements differ by more than 0.06 mm from each other, the installation of the ring gear or the final drive set itself is not correct. Check installation; replace final drive set, if necessary.

Determining thickness of shim "S2"

Formula:

"S2"	=	"S2*" - backlash + lift
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Example:

	Inserted shim "S2*"	1.00 mm
-	Average backlash	0.29 mm
+	Lift (constant)	0.15 mm
=	Thickness of shim "S2"	0.86 mm

- Determine shim(s) as accurately as possible from table. Part numbers

The following shims are available for "S2"

Shim thickness (mm) 1)		
0.15	0.50	1.50
0.20	0.80	
0.25	1.00	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

Determining thickness of shim "S1"

Formula:

"S1"	=	"Stotal" - "S2"
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Example:

	Total shim thickness "Stotal" for "S1" + "S2"	1.80 mm
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REAR DIFFERENTIAL Rear Final Drive

-	Thickness of shim "S2"	0.86 mm
=	Thickness of shim "S1"	0.94 mm

- Determine shim(s) as accurately as possible from table. Part numbers

The following shims are available for "S1"

Shim thickness (mm) 1)		
0.15	0.50	0.90
0.20	0.60	1.00
0.30	0.70	1.20
0.40	0.80	

1) Using the shim tolerance variations it is possible to find the exact shim thickness required, insert two shims if necessary.

Check measurement

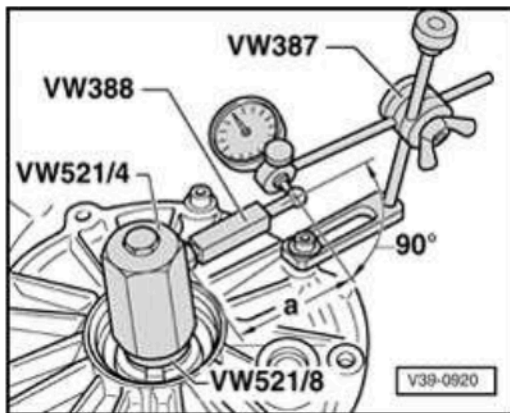


Fig. 130: Installing Measuring Tools

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive pinion with shim "S3" installed
- Differential with shims "S1" (cover side) + "S2" (housing side) installed
- Turn differential 5 turns in both directions so that the taper roller bearings settle.
- Measure backlash four times on circumference.
- Specification: 0.12 to 0.22 mm

NOTE:

- If the backlash is beyond the tolerance, the adjustments must be repeated. Refer to Determining thickness of shim "S2". The total shim thickness "Stotal" must not be changed.
- The individual measurements must not differ by more than 0.06 mm from

each other.

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